RAILROAD GAZETTE

FRIDAY, APRIL 16.

An Early Railroad Meeting.

The article given below is reprinted by the Boston *Traveller* from the Boston *Daily Commercial Gazette* of Sept. 21, 1830. The meeting therein reported is said to have been the first in this country looking to the establishment of railroad connections between the Atlantic and the Great West. There were then but 23 miles of railroads in operation in the United States. It is worthy of note that Montpelier, where a Railroad Convention was to be held, was avoided. when, in after years a railroad was built over the line proposed, and is reached by a branch road. The report referred to is as follows:

RAILROAD MEETING.

At a meeting of citizens friendly to the construction of a railroad from Boston toward the Western states, held at the Court House, Sept. 15, 1830, Elijah Morse, Esq., was appointed Chairman, and J. B. Brown acted as Secretary.

The following resolutions were unanimously adopted:

"*Resolved*, That it is expedient to send five delegates to the convention to be held at Montpelier, Vt., on Oct. 6 next, for the purpose of obtaining information and deliberating upon the subject of a railroad from Boston to the Western states.

"*Resolved*, That it is expedient to appoint a standing committee of fifteen, who shall have in charge the object of a railroad from Boston toward the Western states, and that said committee shall take all measures that they shall deem proper for the furtherance of this object, and shall have full power at all times to fill vacancies in their own body.

"*Resolved*, That if any of the delegates chosen to attend the convention at Montpelier should decline, the vacancy shall be filled by the standing committee.

"*Resolved*, That it is expedient to employ an experienced engineer, to examine, by a cursory view, the route from Boston to Ogdensburg, (as far as may be practicable, previous to the 6th day of October next,) for the purpose of ascertaining whether a railroad can be advantageously constructed in that direction, passing through Concord, N. H., and Montpelier, and Burlington, Vt., and to obtain other general information connected with the subject of said route.

"*Resolved*, That the standing committee be empowered to employ a skillful engineer for that purpose.

"*Resolved*, That it is expedient to appoint a committee of finance, consisting of five persons, whose duty it shall be to raise by subscription such funds as may be necessary to defray the incidental expenses of the contemplated project; and that they create of their own body a treasurer, who shall keep exact account of all moneys received, and shall pay only to the order of the chairman of the standing committee, countersigned by the secretary of said body."

The meeting proceeded to the selection of persons as delegates to the convention, and the following gentlemen were appointed:

Henry Williams, William Foster, George Morey, Amos Binney, Elijah Morse.

The standing committee contemplated by the second resolution was appointed, and consists of the following gentlemen:

Robert G. Shaw, Jonas B. Brown, J. T. Buckingham, William Foster, Henry Williams, William Parker, Luther Faulkner, Henry H. Fuller, Jonathan Whitney, J. P. Bigelow, Isaac Danforth, Nathaniel Hammond, David Moody, Ward Jackson, Winslow Wright.

A committee of finance was appointed in accordance with the sixth resolution, and consists of the following gentlemen:

E. R. Hartshorn, Benjamin Seaver, Joseph Eveleth, Warren Fisher, Joseph Jenkins.

The Russian Railroad to Central Asia.

Under the direction of General Annenkoff the Transcaspian Railroad has made remarkable progress. At the beginning of the present year it extended from Mikhailovsk, on the bay of the same name, to Ghiaurs, a small station some miles beyond Askabad. From thence to Merv the road-bed is finished, and the stations and bridges are constructing. It is expected that trains will run to Merv this spring, and that by midsummer the road will be completed to the Amu-Daria at Charjui, a total distance of 1,041 kilometres. The harbor at Mikhailovsk is very shallow, and the deep water at Krasnovodsk is too distant; but another spot has been found, 24 kilometres from Mikhailovsk, where, by a moderate amount of dredging, the largest vessels of the Caspian can come up to a jetty now building. For the other end of the line, to connect with the railroad, steamers of a special type are being constructed, suited to cope with the swift and shallow waters of the Amu-Daria. The difficulty presented by drifting sands in the desert is to be met by introducing plants, already tested for such purposes in the arid regions of Algeria; and at the principal stations large quantities of them are already being set out in propagating-houses.

This enterprise is a military road, built and designed by officers of the war ministry, assisted by soldiers, Tartars from the Caucasus and Turkomans and other inhabitants of the region. The chief difficulty has not been the sands of the desert, but the want of water; the existing wells being far apart, brackish, and hardly sufficient for the ordinary purposes of the caravans. However, it has been determined by experiment that, at a certain depth in the soil, water exists in sufficient quantity, and increases at greater depths. Artesian wells will therefore be dug, the machinery for which is already on the ground. The worst part of the line determined upon is the desert which extends some 200 kilometres eastward from the Merv oasis. This, though arid and sandy, produces a growth, sometimes almost a wood, of the saxaul (*Haloxylon ammodendron*) and other nearly related shrubs, which only disappear at a distance of some 40 kilometres from the Amu-Daria.

After passing the lesser desert near Mikhailovsk, and reaching the station at Kizil Arvat, the railway takes a direction parallel to the Kopeth range, which coincides with the borders of Persia. It crosses the Akhal oasis, and passes under the walls of Geok Tepe a few yards from the spot where the assault was made by which the fortress was carried. The most important station is Askabad, a flourishing town only three years old, but already enjoying an important commerce with North Khorassan. Farther on, the line passes the Persian village of Lutfabad at a distance of two kilometres, and enters the Attek oasis, now beginning to revive under the security afforded by Russian rule. Duchak, at 391 kilometres from Kizil Arvat, is the most southern point of the line, from which diverge the routes to Séraks, Heshed and Herat. Here the road turns toward Merv, and enters the desert in a northwesterly direction. There are no brooks or springs, but from the mountains to the southeast come two rivers of importance,—the Tajand or Hari-Rud, and the Murghab. The former is dry in winter, but in summer has twice the volume of the Murghab. To the northwest both rivers are lost in the sands of the desert. The Hari-Rud is crossed by a bridge 291 ft. long. From this point it was formerly a distance of 90 kilometres to the nearest fresh water, but this has been diminished to 48 kilometres by a canal constructed by Colonel Alikhanoff during the past season. This diverts part of the water of the Murghab, but it was found impracticable to extend it further. The latter river, unlike the Hari-Rud, does not dry up, but carries in winter 75 cubic metres per second as against 300 in summer. It contains about 2 per cent. of earthy matter, amounting, for the annual epoch of floods, to about 50,000,000 cubic metres of mud, which is spread by the innumerable irrigating canals over the surface of the Merv oasis. The destruction in 1874 of the great dike of Sultan Bend, much diminished the irrigated and fertile area. The Russian government has reserved 60,000 rubles to rebuild this dike, and it is expected that nearly 400,000 acres will be reclaimed by this work, and, in time, nearly four times as much more. This land, when irrigated, is of extreme fertility, wheat producing a crop of 100 bushels for every bushel sown. Merv is growing rapidly; town lots to a certain size are given away, on condition that the receiver builds on them at once. The streets are wide, with broad foot-walks, planted with trees, and bordered with small canals. The oasis is confidently expected to develop largely in the near future.—*Science.*

Contributions.

Substitutes for Engineers' Chains.

ROCKLAND, Me., March 23, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In response to the inquiry of Mr. C. Hain, the advantages of the Grumman chain over the ordinary type are—

1. Its very light weight, enabling it to be readily straightened.

2. Its less number of wearing points, there being in the size I use 200 links, with no rings.

3. The ease with which it can be repaired in case of accident, the makers furnishing with each chain a number of spare links, and a broken link can very quickly be replaced.

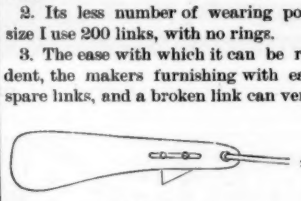


Fig. 1.

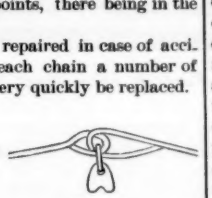


Fig. 2.

I have a handle for the rear end of my chain made in the shape shown in fig. 1 to prevent catching in brush or rocks. The handle is of brass about ⅛ in. thick.

I have in the past been troubled by the "tags" slipping out of place, as when the chain is strained the links will sometimes open enough to allow the small wire on the tags to slip out. I now have mine arranged with brazed rings through the loops of both links so they cannot slip out of place, as shown in fig. 2.

The best tapes I know of on the market are those made by L. Beekman, Toledo, O., formerly made by S. C. Hodgman, the principal difficulty I have seen with them being that sometimes the figures are stamped too deeply in the Babbitt and so indent the steel as to render it liable to break in case of a kink. This difficulty may, however, have been remedied.

The handles furnished with the Hodgman tape are of wire unless a new style has recently been introduced, and frequently cause trouble by slipping. A better arrangement would be a brass handle with a square shoulder for the shoulder of the knob on the end of the tape to bear against. The reel furnished with the Hodgman tape is in my opinion as good as can be had. I am now using a home-made tape similar to the Hodgman, but made from a low tempered steel. It stands more rough usage than any tape I have ever seen, and I am more than ever convinced of the superiority of the tape over any style of chain. I have just completed the survey of a water-shed requiring the measurement of over 10 miles of rough line on which I used the tape with entire satisfaction.

O. H. TRIPP.

Drainage of Road-bed.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am very much impressed with the suggestion of Mr. J. D. Hawks in the last number of the *Railroad Gazette* (page 230) regarding the proper drainage of bad cuts. He fails, however, in putting the blame for these bad places where it properly belongs, on the shoulders of the engineers in charge of the original construction.

An engineer in charge of the building of a railroad, on account of his daily observation of the work under his supervision, is certainly the most competent person to put the whole road-bed in such proper condition before the track is laid that there should not be any difficulty thereafter.

In long wet cuts on light grades (or levels) proper drainage is always troublesome, and the most thorough remedy is either the total removal from the road-bed, for a certain depth below grade, of all objectionable material and the refilling of the space so formed with stone of suitable sizes, giving the bottom such inclination to the nearest embankment that the water may readily find its way out; or the same object may be obtained, to a lesser degree, by laying lines of drain tile the entire length of the cut, with proper arrangements at the ends for carrying the water along the slope of the embankment, on one side away from the track and on the other into the culverts usually provided. In moderately wet cuts one line of drain tile would be sufficient, and that under the centre of the track and at such depth below the same so as to be frost-proof. In cuts in which more water accumulates, three lines would be necessary, one under the track, as just mentioned, and the other two under the side ditches, one on either side of the track (I am now speaking of single-track roads). In lieu of drain tiles, so-called French drains could be used, and would probably be much cheaper, especially where stone can be readily obtained.

Now this work properly belongs to the construction departments, and should be done at the time of the building of the road, the same as culverts or any other appurtenances appertaining to the roads; but unfortunately such work is never done at that time (there may be exceptions, but they are rare indeed), and the drainage of these bad places is left for the maintenance of way department to do after the track is laid.

Now the force usually employed in this latter department, generally one man to a mile, is entirely inadequate for work of this kind, their time being wholly taken up in lining, surfacing and keeping the track in repair. They must thus either neglect the drainage or the work be done by floating gangs and gravel trainmen at a greatly increased expense and also a great disadvantage.

I know that objections may be raised to doing this kind of work at the time of building the road, on account of increasing the cost of the work, which, as is often the case, must be done as economically as possible; but it would be far better to economize at some other points than to omit the important work of proper drainage, for without it and until it is done no first-class track is possible, nor can it be maintained by other subterfuges, such as ballasting or mere surface (side) ditches.

EMILE LOW.

Books and Training for Young Men.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have in my mind a class of young men for whom I have a very warm feeling. I refer to those young men who have finished a course in a high school or an academy, or even a college, and then begin as axemen or rodmen to learn practically the profession of engineering. I would not in the smallest degree belittle the advantages derived from a civil engineering course in a good college, but when a boy without these advantages is struggling up in the profession I feel more interest in him. And I have a greater faith in the success of such a one. If he has that strong love for the profession that will carry him over the rough road of the early years he is likely to keep on climbing. One of the burdens of these young men is their library. It is not difficult to select the first books. All, or nearly all, would advise "Trautwine's Engineers' Pocket Book," and it is safe to say a great majority make this their first book, and rightly so. It is a mechanical memory, and contains nearly everything in a very concise form. After this he will need a table book, and about this there may be some differences of opinion. It it hard to find engineers agreed on these. Personally I prefer Searle's work. On the last construction I was engaged on the engineer above favored Henck's Field Book and the one below was partial to Shunk. There are points in favor of each. I always use Henck's methods with compound curves, and consider his demonstrations of curves most excellent. There are also many excellent points in Shunk, and his work probably assumes less mathematical knowledge on the part of the user than either of the others. Trautwine and one of these latter will probably comprise his field library for many years, but he needs some others for further study, and I will briefly mention a few in the order in which I believe they should be bought.

The "Manual for Railroad Engineers," by Professor Vose, is a complete manual in simple language, never seeking to blind a matter. It covers the whole field of railroad work and will help the novice to comprehend the scope of our profession. It will suggest new uses of his older books also. A work which has been found very useful by many is Wellington's "Computation of Earthwork by Diagrams." By very greatly enlarging the two sheets which apply to the cuts and fills on his road, on buff detail paper, he will find it much easier on the eye, and calculations can be made much closer. It makes an excellent check to use on your sheets after working up your quantities, as it will frequently check errors in your field notes which no number of direct computations would detect. Two persons can proceed very rapidly by one calling the numbers from the field book and setting down the results, which the other calls off, reading from the diagrams as found.

A good work on bridge-building should be owned, and here again opinions will differ. Whipple's work is perhaps as good as we have. Bridge-building is so complex and so great advances are being made, that it calls for more "character" than most other railroad work. Bridges are usually designed in the chief engineer's office, and quite frequently the division engineer has no connection with them at all. Still he should know the principles of the work, and especially the calculating of strains and apportioning of the bridge. Professor Green's "Graphic Method," Vol. II., Stoney's "Theory of Strains," and Du Bois' "Strains in Framed Structures," are all good, and the writer would be unwilling to leave any out. They might be purchased in the order named.

The subject of foundations and pile driving are nowhere, to the writer's knowledge, satisfactorily treated. In the West, a very great percentage of our bridges rest on pile abutments, the approaches are of piling and many structures we commonly call bridges are built like a bridge approach of piles; and yet, to my knowledge, there is no work other than Vose, which devotes much space to the question. It is often a question with an engineer whether he should fill an opening for a culvert or a pile trestle. Again, there is often a chance to extend piling to where it meets the waste of a cut, and save an expensive borrow, if the bank be high. "Limes, Cements and Mortars, by General Gilmore, is an excellent work on its line, and the subject of masonry is well

Fig. 1.—Point at which Break Occurred. Track Refilled, but not Ballasted.

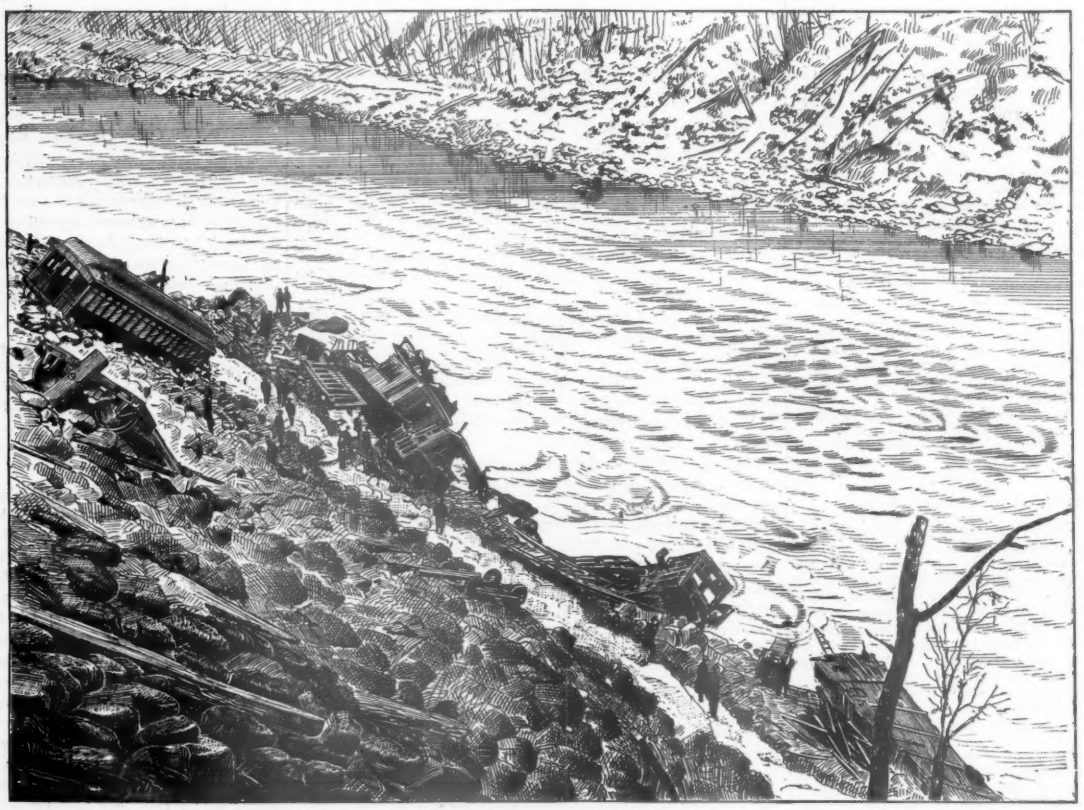


Fig. 2.—View of the Wreck at Foot of Slope.

THE WEST DEERFIELD ACCIDENT.

The engravings given herewith show the scene of the catastrophe on the Troy & Greenfield Railroad, near West Deerfield, or Bardwell's Ferry, Mass., on April 7, which is discussed in another column. The first view shows the locality at which the break took place in the immediate foreground, opposite, (or rather, under) where the trunk stands. It had, however, been refilled before the photograph was taken. The second view shows the wreck on the day following the disaster. With the exception of the single car-body shown, which is practically intact, the entire train was broken up into kind ling wood. Most of the cars left their trucks at the top o the bank, but a few of them were dragged down with the cars and are visible in the view.

treated in "Mahan's Civil Engineering." At the risk of seeming to advise poor work, I will remark that he will not be apt to do his work as is there directed.

I cannot safely go farther, and it might not be wise. If he is a beginner, by the time he needs more than Trautwine, Vose and one of the table books, we may have better works than I have named.

A year ago we had a discussion on maps and topography. Can we not this year have a friendly discussion of some other methods of work? How do my brother engineers compute overhaul? Is there not some better method than our old slow and tedious way?

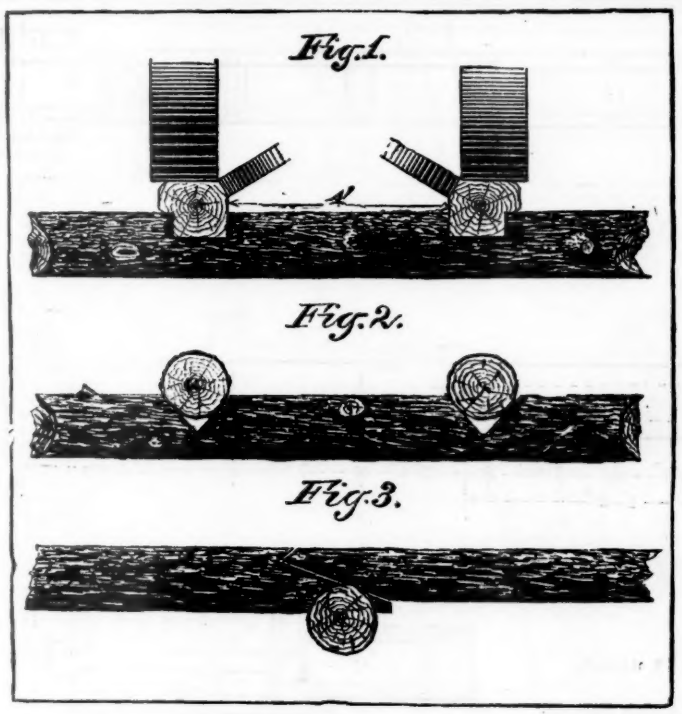
ASSISTANT ENGINEER.

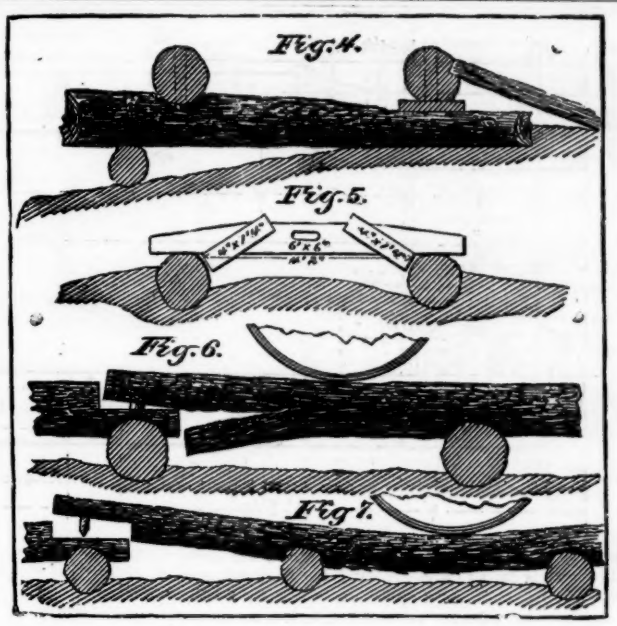
["Assistant Engineer" has omitted to include any good books on physics and mechanics, a thorough knowledge of the elements of which at least is essential, if the engineer is ever to be one in fact as well as in name. Trautwine in part supplies this need, but in too "popular" and incidental a fashion to be of the greatest service as a text-book for learners, and with far too much the air of "providing a collection of mere rules, professing to require only an ability to read for their successful application." When such a book as Trautwine is, in fact, used merely as a "mechanical memory" *of things once learned*, it is of great value, but as a substitute for more methodical and systematic methods of study it is rather more than questionable whether such royal roads to learning are not doing more harm than good. But then, on the other hand, it must be admitted that many of the books of a more systematic nature are justly open to the charge of "deliberately inflicting avoidable obscurity on the student for the sake of the mental discipline involved therein." Altogether it is somewhat difficult to advise young men, especially those studying alone, just what books they should study, but the general fact may be pointed out, that where they usually fail is in thoroughly grounding themselves in the *elements* of algebra, geometry and trignometry and —above all—mechanics. Todhunter's books on these subjects "for beginners" (the title being rather a misnomer) are admirable for the lesson of thoroughness they inculcate, and too little used in this country. D. K. Clark's "Manual for Mechanical Engineers" is another book that civil engineers might well have and study. The *habit* of investigation and study has far more to do with success, however, than the particular books used.—EDITOR RAILROAD GAZETTE.]

The West Deerfield Accident.

The Physical Constitution of Cast Steel.

Some interesting experiments with regard to the cellular structure of cast steel have been carried out at the Creusot works by M. Osmond and M. Werth. The experimenters found that, if the thinnest conceivable sheets of the metal





POLE ROADS.

are placed on glass and covered with nitric acid, the iron will be dissolved, while the skeleton remaining, revealing the distribution of the carbon in the steel, will, on examination by the microscope, furnish undoubted evidence that such distribution is by no means uniform, and that the cast steel consists of minute granulations in soft iron, separated, for the most part, by partitions made up of a different substance, a caburet of iron. In other words, cast steel is cellular in structure, the iron constituting the kernel and the caburet of iron the shell. The elementary or simple cells thus constituted come together in composite cells or separate agglomerations in the thin sheets, which are thus rendered transparent by empty lines. These latter represent closed polygons of relatively large dimensions in the cast steel, but the polygons become smaller and broken up inproportionate to the more perfect manipulation of the metal.—*Iron.*

Cowles' Patent Locomotive for Pole Roads.

The accompanying illustration represents a peculiar form of locomotive built by Messrs. Spangenberg, Pendleton & Co., of Warren, O., for service on log or pole roads, illustrations of which are also given, showing in detail the methods of construction adopted.

The engine shown in the illustration, fig. 8, has hauled 5,000,000 feet of logs over a pole road 14 miles long. The cost of this road, not including any value for the ties and poles, varied on ordinary ground from $100 to $500 per mile. Grades of 176 ft. to the mile were used.

The engines have four large driving wheels, and utilize the entire weight of the machine for adhesion. The axles do not swing around in the usual way for guiding the engine, but the wheels are connected to them by universal joints, inside the hubs, by which they are permitted to shift or vibrate on the axles, for steering the machine. The hubs extend in and are coupled to a block which has a slot to slide forward and back on the axles, as the wheels swing, and hold the hubs so that the wheels are held rigidly upright. Steering is effected by a rocker, midway between the axles, having four arms, one of which is connected to the sliding block of each hub and operated by a screw turned by a hand wheel from the foot plate, in the usual way, so that the direction of all the driving wheels is changed at the same time. The traction engine can thus be turned to a radius of 27 ft., and can be steered on a track the same as on a common road, which relieves it from friction on curves.

There are two cylinders, with link motion reversing gear, etc. The crank shaft is carried in a cast-iron casing about midway between, and nearly on a level with the axles. It entirely incloses the cranks, eccentrics, speeding gear, etc., and forms a dust-proof casing for them. Power is transmitted to the forward axle of machines with upright boilers, and to the rear axle of those with horizontal boilers, by a train of spur gears, inclosed in a dust-proof case, one end of which is pivoted to the crank casing, which allows the axle to play freely up and down without interfering with the transmission of power, when the springs which support the engines yield as the wheels pass over obstructions. The other axle is driven from the geared axle by coupling rods and cranks. These connecting rods are relieved of strain in turning, because the axles are kept parallel by bars connecting the bearing boxes of each wheel, just inside the hubs, but allowing them to twist vertically, so that each wheel can pass over an obstruction 18 in. high, or drop into a depression 18 in. deep without unduly straining any part of the machine. The governor is adjustable from the foot-plate by a lever, and permits the engine to run from 120 to 240 revolutions per minute. The gears are arranged to give three different speeds. On the slow speed, which is about 1½ to 3½ miles per hour, the engines make 13 revolutions to the drivers' one. This speed is used to overcome steep grades, bad places, etc. The medium speed is about 3¼ to 6½ miles per hour, the engines make 6½ turns to drivers' one. This speed is used for hauling on good dirt or tram-roads. The fast speed is about 6½ to 13 miles per hour. and the engines run about three to one. It is used in moving the engine or a train of empty cars from place to place, or for hauling on iron tracks. It removes the necessity of running the engines at a high rate of speed, when it is desired to move rapidly.

All the gears and parts subject to wear or heavy strains are made of cast steel; the boxes and bushings are made of phosphor-bronze. The machine is as complete and self-contained as a railroad locomotive, and all the changes and movements necessary to its operation can be made by the engineer from the foot-plate.

The engines are made in four sizes, but the following dimensions relate to the largest size only:

Cylinders, dia. and stroke	8¼ in. × 11 in.
Revolutions per minute	120 to 240
Boiler, length and diameter	126 in. × 24 in.
Flues, number	74
" length and diameter	66 in. × 1½ in.
Fire-box, length and width	36 in. × 23 in.
Height	33 in. and 40 in.
Heating surface	200 sq. ft.
Drivers, diameter	65 in.
" width of face	14 in.
Speed, miles per hour	1½ to 13.
Capacity tank, gallons	1400
Weight of engine	12,000 lbs.
Weight hauled up 170 ft. grade	45 tons.

The makers claim that a pole road can be successfully operated if the engines and rolling stock are of suitable design, and that the numerous attempts to adapt the rolling stock of iron railways to wooden tracks have failed mainly because of the rapid abrasion due to use of flanged wheels which, on curves especially, speedily destroy the track or "bight" on the rails and throw the cars off. It is stated that the engine shown in the cut has been found to overcome these difficulties, and works as well in practice on a pole-road or other wooden tram-way, backing, switching and handling in every way as easily as a locomotive on an iron track, while its ability to run on a common road makes it easy to move to a tram-road distant from means of transportation. The four large flat-faced driving wheels are kept on the track by means of guide wheels running against the inside of the rail. *No flanges are used* and there is no abrasion of the track, or binding or slipping of the wheels, and no friction but that of rolling. The cars are built in the same way as to their wheels, and it has been found in practice that the life of the track is about doubled, and its efficiency correspondingly increased by this system of guide wheels in place of *flanged or concave.* (In fact, concave wheels have proved more destructive to wooden tracks than those with flanges.) Engines designed for running on dirt roads are quickly adapted to pole road use by means of plates placed over the road clips. In fact, the wheels of the pole-road engines are first built with road clips and then plated, in order that they may be run on dirt roads if desired.

The cheapest form of pole-road is shown in fig. 5, and is used on level ground. The poles are partially bedded in the ground and the earth banked up on the outside. As there is nothing running on the outside of the poles, the earth can be banked up level if desired. When it is necessary to carry the poles above ground, ties should be used, as in fig. 2. They should be firmly bedded in the ground, and notched to receive the poles. The distance which ties may be placed apart depends upon the size of poles used. They should not be less than 6 inches in diameter for the lightest engines, and they may be from that up to 24 in. The ties may be placed from 6 to 12 feet between centres.

It is of the utmost importance that the roads should have a firm foundation. The ties should have the same bearing upon the ground that the poles would if laid directly upon it. When the ties will not fill the space between poles and the ground, they can be raised upon blocks, as in fig. 4. The blocks should be larger than the ties, and should have as firm a bearing on the ground as the ties would have, and besides, they should be notched to receive the ties, and the pins which go through poles and ties should also go into the blocking. Fig. 4 also shows how advantage may be taken of stumps and trees along the road to "shore up." The brace or shore should be firmly secured so that it will not rattle out. It also shows how the rail can be blocked up from the ties. In any case the ties or pole should be notched in or faced so that they cannot roll and break the pin. When is is necessary to carry the track higher, as in crossing ravines, it should be carried on cribs. Figs. 6 and 7 show a very common and almost the worst possible way of making a splice, and how such splices work when put to use.

Fig. 3 shows the proper method of making a splice. When practicable, lay the large end of the pole in the direction in which you are building the road, saw it off to the right length, then saw in slanting from 4 to 6 in. deep, and about 18 in. from the end; split out and trim off, slanting down to the end of the pole. Fit the small end of the next pole to this place, so that the inside and top edges of the two poles will be about even. Bore the pin pole, preferably slanting back.

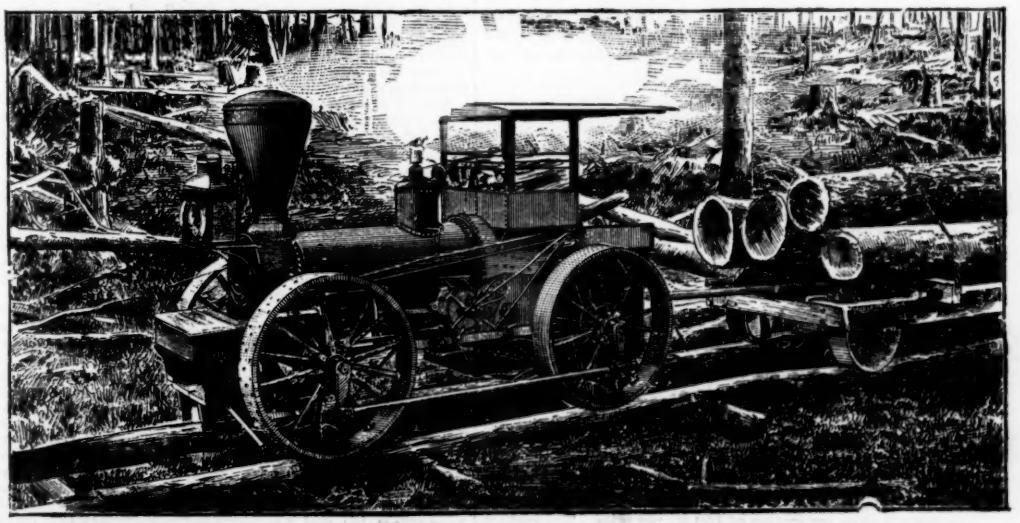
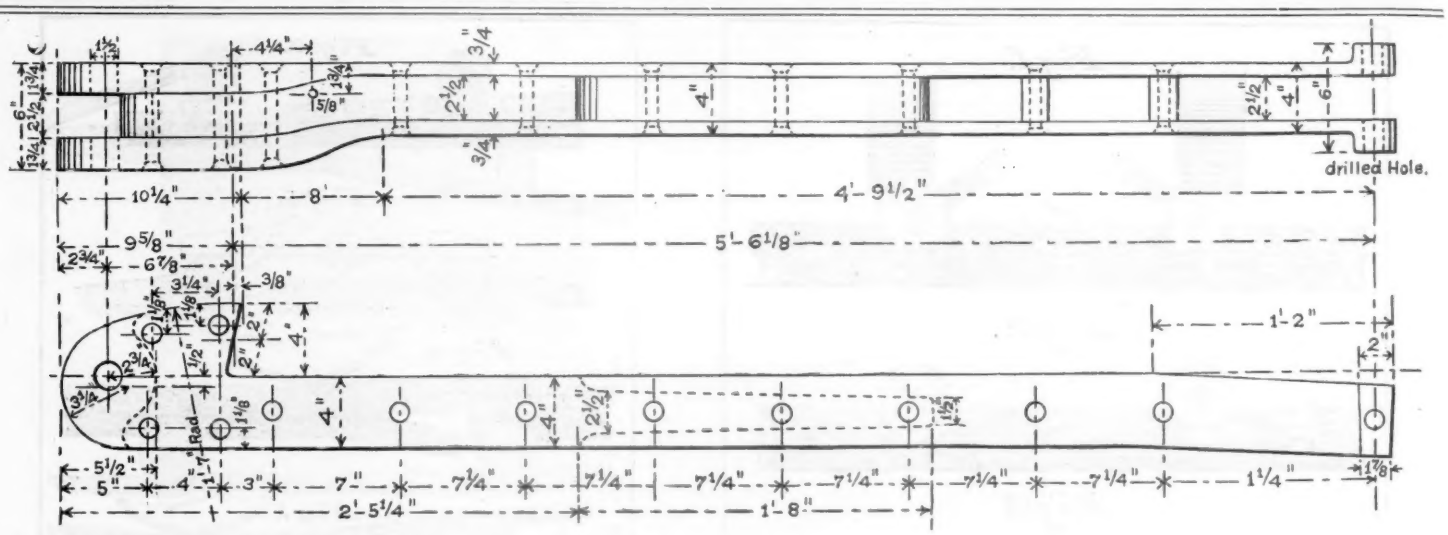


FIG. 8.—COWLES' PATENT LOCOMOTIVE FOR POLE ROADS.

Constructed by MESSRS. SPANGENBERG, PENDLETON & Co., *Warren, Ohio.*



In this style of splice the top rail is held down by the dovetail splice and is full size where it leaves the other rail, and therefore will not split, as a splice made like fig. 6 will. When the ties and poles are well notched in, it is not necessary to pin the pole to every tie, but one or more pins are needed between every splice, and *both poles* should be pinned to the *same tie*. The pins should be made of sound tough timber not liable to rot, and should be not less than two inches in diameter and long enough to go through the pole and tie. To insure evenness, they should be drawn through a former or "pin die." Fig. 5 shows a gauge for laying track. It consists of a straight-edge, 6 ft. 6 in. long, with two pieces of 4 in. by 16 in. fastened on; their outside upper corners 4 ft. 2 in. apart, and ½ in. below the lower edge of the straight-edge, and the lower inside corner 3 in. above the lower edge of the straight-edge. These two pieces represent the guide wheels of the engine and should pass easily between the poles. If, by reason of crooks, there should be 6 in. of play it will not matter.

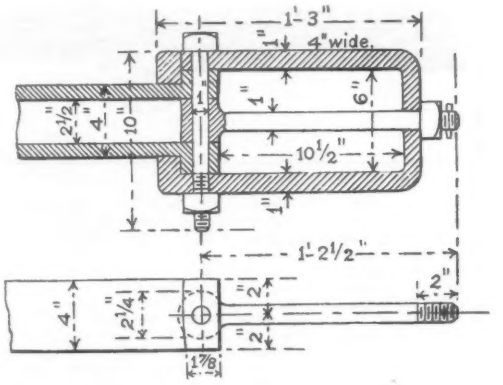
The most difficult and expensive roads to build are those through swamps, the trouble being to prevent their sinking. The best way is, in clearing the right-of-way, to corduroy the bed with the small stuff and brush, so as to get a bearing over the whole surface of the ground. Avoid placing ties or poles on stumps or roots in such places, as they will not settle, while other parts will, making it, in time, very uneven.

Curves are made by laying poles as on tangents, except with angle at each joint, suitable to make curve, corresponding to the degree required. It is stated that there is no difficulty in going around such curves, though, of course, the motion is more "jerky" than on a nicely adjusted circular or "spiral" curve.

Improved Miller Hook, Chicago, Burlington & Quincy Railroad.

The accompanying illustrations represent an improved form of Miller hook as used on the Chicago, Burlington & Quincy Railroad. The Miller hook formerly applied to the passenger cars of this line was fitted with a rail bolt 1⅛ in. diameter. This bolt was very unreliable, it broke constantly, mostly through the thread, and delayed the passenger trains, being also a constant source of anxiety less accidents should happen to these trains from breaking in two. To remedy this the bolt was abandoned, and a yoke fitted as shown on the engraving was used instead. Since then there has never been any trouble with the passenger trains breaking in two, unless a foreign car improperly fitted happens to get in the train. The old rigging answered well enough for 5 and 6 car trains on branch lines, or light trains on the main line; the difficulty was on 12 and 14 car main line trains, especially with the baggage cars, and consequently it was found absolutely necessary to get a stronger rigging.

The construction of the hook has also been altered. The old hook was made with an intermediate casting and ⅝ in. plates top and bottom. The wood packing piece used in the old hook has also been abandoned. As an example of improved construction under actual conditions the hook will be useful to our readers.



IMPROVED MILLER HOOK.

Chicago, Burlington & Quincy Railroad.

The Mersey Tunnel.

We are indebted to the *Mechanical World* for the following description and illustration of this remarkable work:

This great undertaking, which is now in complete working order, is of such general interest that we give a longitudinal section of the line from Lord street, Liverpool, to the Borough road station on the Cheshire side, together with several cross sections showing the relative positions of the air and drainage headings; a section also of Green lane station showing the platforms, retaining walls and tunnel entrance. As visible in our engraving the underwater portion of the Mersey railway consists of two slightly inclined lengths of tunnel of a collective length of over ¼ mile and two steep gradients of about ¼ mile on the Birkenhead side, and ¼ mile on the Liverpool side, the inclinations being 176 ft. and 196 ft. per mile respectively, the total underwater length being about 1,232 yards from sea wall to sea wall. Past the sea wall the tunnel continues at the same inclination to the James street and Hamilton square stations, beyond which at the Liverpool side the line is being extended under the town towards the Central Station,* at an incline of 170 ft. per mile, and at the Birkenhead side towards Borough road at an inclination of 150 ft. per mile. The surface of the rails at Liverpool in the James street station is from 85 to 100 ft. below ground, and the section of the tunnel is enlarged at the stations to 50 ft. 6 in. span by 32 ft. in height above rails, the length of the stations being 400 ft., and the gradient 53 ft. per mile for this distance. The tunnel proper has a width of 26 ft. and a height of 19 ft. above rail surface.

The stations are large, well-lighted structures, into which entrance is effected by a short flight of steps leading from a lower hall, which forms the delivery platform of three hydraulic lifts or elevators communicating with the station at the ground surface. These elevators each accommodate about 100 people, and serve also as a means of communication with the engine and boiler department. At Birkenhead the boilers are placed on a floor separated about 30 ft. from the roof of the lower, waiting hall by a solid mass of sandstone, which was, therefore, left untouched, the boilers being of Lancashire type set in brickwork. At the Liverpool side, however, the rock was found so much fissured that this 30 ft. of floor thickness had to be removed and a flooring of iron girders instead employed. On this account the boilers at the Liverpool end are of the marine self-contained type, and no brickwork is used in the seatings. The distance between the two stations centre to centre is about 2,000 yards, the working shafts being about 231 yards nearer. The greatest depth of water at average high water is 100 ft., and at that point the tunnel crown is about 30 ft. below the river bed. From the foot of each incline beneath the water a heading for drainage purposes was run as far as the working shafts at each end at a slight incline shorewards. This served to keep the main tunnel clear of water during construction, as well as now acting in the same capacity. Besides the drainage heading, a loop heading for ventilation purposes runs alongside the tunnel from end to end, rising rapidly to the fan airways.

The fans are four in number—namely, two at each end, of 30 ft. and 40 ft. diameter. At each end the 40-ft. fan is employed in ventilating the tunnel proper, drawing air from the ventilation drift, which communicates with the tunnel at several points, as shown. By this arrangement all entering fresh air must pass in at the stations, which are always fresh and clear; and as the quantity of air dealt with by the fans in ten minutes is equal to the capacity of the tunnel, it is evident that the train service provided for is a very frequent one, as with a ten minutes' service the tunnel would be cleared of all smoke between trains. The 30-ft. fan on the Birkenhead side clears the tunnel between Hamilton street and Borough road, and that at the Liverpool side is intended to clear that portion beyond James street in the direction of Central Station.

Messrs. Walker Brothers, of Wigan, are the makers of the fans, which are on the Guibal system, and they are considered fully equal in their collective capacity to half a million feet per minute.

Among difficult engineering works the Mersey Tunnel does not hold a place, for beyond the care necessary to secure correct alignment and level no serious difficulties have been encountered. The tunnel has been excavated almost entirely in solid sandstone rock, but at one point it cropped out of the sandstone for a distance of 100 yards, and the tunnel crown was here excavated to a height of 4 ft. in overlying gravel and sand. Had it not been that this in its turn was overlain by a bed of strong bowlder-clay, much trouble must have been experienced at this point from the accession of water. The clay prevented this, but to avoid rupture of the clay bed by the giving way of its gravelly foundation, special care was exercised at this point in timbering heavily to stay any possible roof movement. The Beaumont diamond boring machine was used in forming the heading and also in forming the air-way drift or loop heading alongside, and though great delays and disappointments occurred before the Mersey Tunnel scheme assumed practical shape, the work once commenced went on uninterruptedly to the finish, which was just over six years from the date of commencement, December, 1879. The first operation after sinking the shaft was to run a trial heading from either side, and it is worth notice to remark that on the Liverpool side much made ground was passed through at the foot of James street before the old ground level was met with. The two headings were then driven forward at a slight rising gradient toward the centre of the river and thus kept the works dry, pumps, made by Hathorn, Davy & Co., of Leeds, having been put down at each end.

In September of 1881 two new shafts were sunk so as to allow of one shaft being exclusively used for the pumping, while the other served for the output of spoil. As the drift-way proceeded the tunnel proper also was excavated, and as this had an incline toward the river centre, bore holes were made between the tunnel floor and the drift way beneath, and so kept the face of the work dry. The drift-ways met in January, 1884, and much of this progress is considered due to the Beaumont boring machine. The tunnel was enlarged at several points in the course of the drift-way and bricked up with six, seven and eight rings of blue Staffordshire faced brickwork. To warrant such a proceeding in face of the fact that a base line for the alignment of the tunnel centre could only be obtained of a length of four yards, and that in a shaft not in the centre line of the tunnel, the greatest care was exercised in the instrument work, and the confidence reposed in this work was justified by the result, which was practically accurate, a deviation of less than 2 in. only being all that was made between the drifts from both sides. As visible from our engraving the tunnel section is considerably varied according to requirements necessary, the cross sections varying in different portions of its length according to the circumstances attending, such as strata, etc.

Section *B B* is from a portion of the line not shown in our drawings—namely Green-lane Station at 1,650 ft. from the junction of the Mersey Railway with the London & Northwestern and Great Western joint line. The section shows the raised station platform and the main platform retaining walls being shown in section, while the tunnel portal is in elevation. The platforms are here open to light, though considerably below ground level. The retaining walls rest upon concrete foundation.

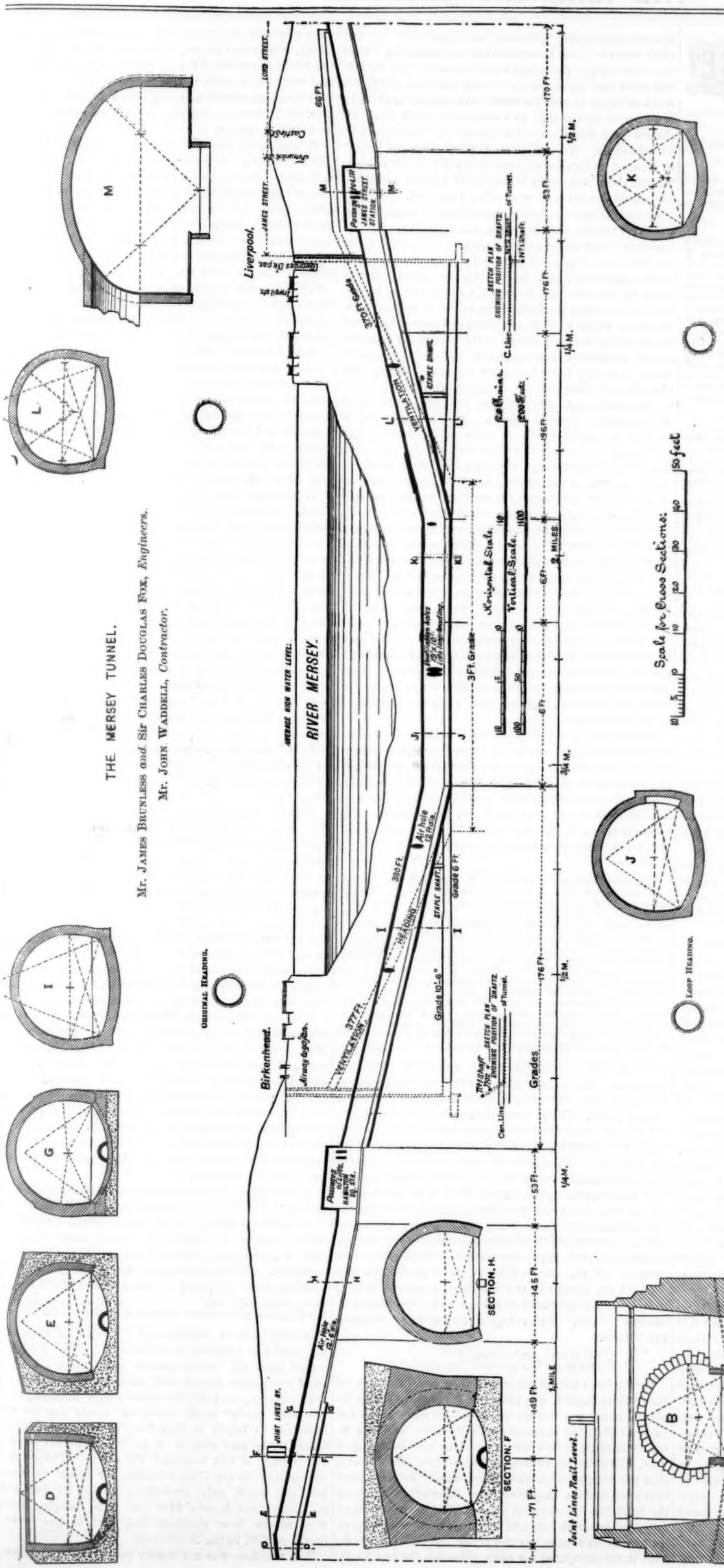
D D is the section of the tunnel proper at the point where the falling gradient toward the river may be said to commence. Its flat roof continues for a short distance only, changing rapidly to the form *E E*, the body of the tunnel being so near the surface being well reinforced by concrete backing. Further on at *F F* the line passes beneath the joint line of the London & Northwestern and Great Western railways, and the section is therefore very strong for a short distance, as the weight of the overhead line comes upon the crown of the tunnel, which is carried well out laterally and covered in concrete. Section *G G*, still not far from the surface, is of even stronger section, while at *H H*, where the bottom is of rock, no invert has been required.

Sections *I I* and *L L* are of the inclined portions of the underwater portion of the tunnel, showing the drainage heading below, while at *J J* and *K K* are two sections of the almost horizontal portion of the tunnel, showing the loop heading or airway, and in section *J* the recesses in the side walls are places of refuge and safety for workmen, and tool depositories. It will be noticed that from the middle point beneath the river the tunnel falls slightly both ways to the steep gradients, because for this length the tunnel forms its own drain, and the invert is of greater depth than elsewhere in the underwater length. Beyond the ends of each of these slight gradients, however, the whole of the drainage from the tunnel is conducted by the lower drainage drift to the pumping shaft on each shore, where it is dealt with by the pumping engines. The amount of water percolating is very small, and it is probable that this will decrease under the operation of the well-known natural silting process, which is found to fill rock crevices with clayey matter from upper strata in cases where the percolation is so slight as not to amount to a scour. With a tunnel lined with Staffordshire blue brick (the hardest and most impenetrable known), and pierced through solid rock, such percolating water must leave all clayey matter outside the tunnel, so that in time it may become quite dry throughout. At *M M* the section is shown of the James street station, showing the openings to the lower waiting hall.

We show also two small sketch plans showing the position of the two shafts at each side of the river. For anything else the drawing (for which we are indebted to Messrs. Brunless and Fox) is self explanatory.

The three direct acting hydraulic elevators at each end have been constructed by Messrs. Easton & Anderson, of Erith Kent. The elevators at James street have a rise of 76 ft. 6 in. and those at Hamilton Square of 87 ft. 6 in. At

* The Central station is the main line union passenger terminus of the Midland, Great Northern, and Manchester, Sheffield & Lincolnshire Railway, and is not shown in our illustration, being further to the right.



each station is a tower containing a tank 120 ft. above pavement level for the purpose of working the elevators. These tanks contain 12,000 gallons of water and the waste well is placed 60 ft. below pavement level.

The rams, one to each elevator, have a diameter of 18 in. and are of steel, hollow. The cylinders are sunk in bore holes cut in the solid rock and of great strength, and each elevator cage—which is a room 20 ft. by 17 ft., very well gotten up in teak and ash—is carried on the ram head by means of a framed floor of iron girders. Suitable girders are placed in the shaft to guide and steady the cage, and balance weights are used so that the elevator will descend with the weight of one man.

The engineers for the company are Mr. Brunless and Sir Charles Douglas Fox, Mr. A. H. Irvine being Resident Engineer. Mr. Waddell, of Edinburgh, was the contractor.

The trains are worked on the block system, and are fitted with the simple form of automatic vacuum brake now in general use on the majority of English railways. The cars are of three classes, very comfortably fitted up, and lit with Pintsch's gas, a system which is much liked in England and Germany, and is here used on the Erie and other lines. It is hardly necessary to point out that on an underground railroad a brilliant and steady light for the cars and stations is essential. Passengers coming from a sunlit street would be practically blindfolded by any inferior method of illumination.

TECHNICAL.

The Latest Development of the Compound Engine.

The following remarkable results obtained from a small set of quadruple expansion engines are referred to elsewhere in our columns. *The Mechanical World* states:

"The yacht 'Rionnag na Mara' built by Messrs. J. Reid & Co., Port Glasgow, is the first vessel fitted up with Messrs. Rankin's patent six-cylinder disconnective quadruple expansion engines working on three cranks. Her dimensions are as follows: Length, 147 ft. between perpendiculars; breadth, 21 ft.; depth, 13 ft. 6 in.; the tonnage is 311, and she is to be fitted up in the most luxurious manner. The engines have three high-pressure cylinders each 7 in. in diameter, working over first intermediate, second intermediate, and low pressure cylinders of 16, 22, and 34 in. diameter respectively, with a stroke of 24 in. The boiler is of steel of the ordinary tubular type, 9 ft. 10 in. long by 12 ft. 6 in. diameter, and has two Fox's corrugated furnaces 3 ft. 5 in. internal diameter, the working pressure being 180 lbs. to the square inch.

"During the trial of the engines, steam was raised by means of ordinary Scotch steam coal to a pressure of 170 lbs. to the square inch, and was kept steadily at that pressure for about an hour before proceeding to the measured mile. On arriving at Skelmorlie she commenced her progressive trials, and on the full power runs the engines developed a mean indicated horse-power of 528, running 113 revolutions, and expanding 12 times. After this further runs were made at reduced speeds to complete the trials. The fires were then cleaned and the coal consumption trials were commenced, the fuel used being Penrikyber Welsh coal. During the first hour 467 lbs. of coal were burnt; during the second hour 468 lbs.; and during the third hour 456 lbs.; being a total of 1,391 lbs. for the three hours, or a mean of 463.6 per hour. The mean revolutions were 102.2; the mean steam pressure 170 lbs., expanding 13 times; and the mean indicated horsepower 412. This gives the extraordinary result of 1.125 lbs. consumption per I. H. P., and shows a saving of 40 per cent. over the best compound engines and of 17 per cent. over the best triple expansion engines of similar size. As the consumption and power during the three hours' run showed such steady results, it was considered unnecessary to further prolong it. No lubricant was used in any of the cylinders during the whole day's steaming, but notwithstanding this the engine was run as low as 10 revolutions, or a piston speed of 40 ft. per minute. The feed-water was kept about 115°, and the vacuum about 25 in.

"What possibilities lie before the marine engineer owing to the introduction of quadruple expansion it is at present too early to estimate, but it seems probable that as the compound engine has, to a large extent, been superseded by the triple expansion engine, so the latter in its turn may have to yield before the latest advance of marine engineering. Messrs. John F. and Matthew Rankin, of Greenock, have for some time past devoted their attention to this department of engineering science, and the result of their labors, in the opinion of many, bids fair to almost revolutionize the modern type of marine engines."

Soaking-Pits for Tires.

The Osnabruck Steel Works are making use of soaking-pits for the slow and uniform cooling of tires after rolling. The pits used are constructed in the ground, in the usual manner, of firebrick material, and are of such a size that they hold 12 tires, one placed on top of the other. The tires, as soon as they are rolled, are taken to the pits by means of traveling cranes, and are left to cool for three or four days in the closed pits. Experiments have proved that tires cooled in this way have 50 per cent. greater strength than those cooled in the usual manner in ashes or simply exposed to the air.—*Iron.*

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE WEST DEERFIELD CATASTROPHE.

It will probably be a surprise to many that the disaster on Wednesday of last week, April 7, on the Troy & Greenfield Railroad, near West Deerfield, Mass., was one of the most serious accidents of its nature on record, and with the sole exception of the bridge disaster at Tariffville, Conn., Jan. 15, 1878 (and possibly one or two other exceptions which we do not recall), is much the most serious accident in any way directly chargeable to mechanical defects of structure which has occurred in the United States since the fall of the Ashtabula bridge on Dec. 29, 1876, over ten years ago. One feels a certain hesitation in asserting that in all these years no accident due to defects of structure has even very closely approached it in seriousness, but after some search we have not been able to find one. The Tariffville disaster proves the rule that "misfortunes never come singly," as did the Chicago and Boston fires, by killing 13 and injuring 70 others within only a few days more than a year after Ashtabula, but both of them still maintain their unenviable pre-eminence in this country.

In fact, there have been but few railroad accidents of any kind so serious as that of last week in the whole period since Ashtabula, and these appear to have been all chargeable primarily to errors in operation, although in several of them mechanical imperfections have contributed to increase the disaster. This immunity has not extended to the entire continent, since in the interim occurred the accident on the Morelos Railroad in Mexico, July 1, 1881, caused by the fall of a very badly-constructed bridge, in which, out of a train load of soldiers, 247 were killed, 40 injured, and 20 only escaped uninjured; but this bridge was built by inexperienced Mexican engineers, none of whom had hardly more than seen a railroad before, so that the catastrophe was of the class which might occur in the infancy of the railroad system in any country, rather than a normal type of railroad accident. It still enjoys the distinction of being the most fatal on record. The Tay bridge disaster, Dec. 28, 1879, in which the entire train-load of 75 persons were lost, has also intervened in this period, but the United States, since Ashtabula and Tariffville, have been fortunately exempt.

That the catastrophe last week was less serious than the one at Ashtabula would appear to have been due less to any difference in its essential character than to the chance that the train was a smaller one. In each case, as it happens, the whole train load were either killed or injured, with but a few individual exceptions; but whereas at Ashtabula the train consisted of two engines, three express and baggage cars, five coaches and three sleepers, in last week's catastrophe there was but one engine, three baggage and express cars, three coaches and one sleeper, or seven cars and one engine in all, against 11 cars and two engines in the other. In each case, by another coincidence, the engine (head engine) alone remained upon the road-bed, and the remaining cars followed each other into the abyss. In each case the added horror of fire almost immediately followed, although with far less fatal effect at West Deerfield than at Ashtabula. Had there been eight passenger cars instead of four to follow after and fall upon each other and thus finish the work of death in the forward cars which had only been begun by the fall, we can hardly doubt that we should have had a very close parallel to the accident at Ashtabula. As it is, whereas there were 80 killed, 55 injured and five uninjured in a total of 140 at Ashtabula, there were only 10 killed, 35 injured and three uninjured in a total of 48 at West Deerfield.

From this purely fortuitous difference alone it will probably result—in fact, it has resulted—that the accident will not attract a tenth part of the attention nor its lesson be a twentieth part as forcibly impressed on public attention; but, fortunately, no great harm is done by this, because its lesson is not nearly so important nor so clear. In fact, so far as can be judged from the facts which have as yet become known, the chief lesson of this latter accident is the impotency of man's fallible judgment to secure entire safety by whatever care. It is easy to be wise after the event, and declare that the very fact that the accident occurred is proof of originally bad construction, for which the original engineers were to blame. So in one sense it is, but in another and a truer sense it does not yet appear to be so, if indeed it may not be said that the contrary is proven. The road was built, to single track, in 1864, or over twenty years ago. It was double-tracked in the vicinity of the accident in 1881, leaving the original single track untouched and on the outside. The work was done by the state, and we may presume no proper expense was intentionally spared. At the point of the accident the road is carried along the face of a precipitous rocky bluff, the original track having been partly in excavation and partly on an embankment of roughly piled up rock which was certainly not regular enough to be called a dry retaining wall, but which is said, in one account at least, to have been to some extent arranged by hand, as indeed would appear to have been essential to have the fill hold at all, since the natural slope of the surface is about 1 to 1, it being 101 ft. out and 100 ft. down from the outside rail to the river bank.

The engravings which we present in another column, which have been carefully reproduced from photographs, show clearly the nature of the locality where the derailment occurred (the break having been refilled before the photograph was taken) and its consequences at the foot of the slope. The testimony of General Manager A. W. Locke, taken on Monday of this week before the Railroad Commissioners, was as follows:

"The road-bed was 31 ft. wide, 7 ft. being between the outside rail and the edge of the slope. It has not been changed since the road was built [to single track] in 1864. *The outer track was not moved when the second track was built.* The second track was put in use in September, 1884, and was laid by digging out on the side of the ledge. The road-bed was thus widened 12 ft. and what material came out was cast over on the outside. No indication of weakness on the outer track ever came to his knowledge. He has examined it a hundred times, and there was no weakness. The embankment was constructed entirely of rock. From the facts it appeared to him that the bank had gone down and left the track. The ditches were 20 in. deep. The water flows west in the ditch, and when there is a sufficient amount of it it escapes through a culvert. All the water flowing there at the time of the accident could run through a 1¼-in. pipe."

All the other evidence taken agreed in substance with this. The supervisor had been over the track on foot a few days before and never suspected weakness at that point. The section-master had been over it a few hours before the accident and saw nothing wrong. Another employé and the engineer and conductor of the preceding train gave the same evidence. Track-walkers regularly went over the track four times a day, and the one last on duty had spent an hour cleaning out ditches at that particular point the same morning (although he and several others testify that there was no more water there than was usual in the spring). Finally, the newspaper statements of the engineer and fireman of the doomed train, who alone saw the track at the instant of the accident, agree in saying that the track appeared to the eye to be "as clear and smooth as any," until it began to sink away beneath the wheels.

> "All at once, and nothing first,
> Just as bubbles do when they burst."

To the most important question of how the toe of the bank appeared, it is probably forever too late to obtain an answer, for no one seems to have noticed it particularly; but railroad men who have had opportunity to observe how structures fail and banks give way, will probably be disposed to believe, as we are, that the deterioration was almost wholly internal, and that even had an inspector been carefully examining the bank but the moment before it fell, he would have failed to detect any sign of danger which would have led him to scrutinize further; for old works which have stood uninjured for some years are far less likely than new to fail, as it were, piece-meal, and more likely, if they fail at all, to give way all at once. A bank which has stood for 22 years without slipping, and which had been "strengthened" two years before by adding more material on the outside, is usually, and very pardonably, looked on with a good deal of confidence.

This being so, it is with no common satisfaction that one feels driven to the conclusion that this, the most serious accident of any kind in the United States for two or three years, is, in as full a sense as is often possible, one for which all concerned are free from blame. The accident is, in fact, one of a very unusual character. In a search of some length through our accident records, we have been unable to find another like it, and the only one precisely like it which we recall was on the Cheat River grade of the Baltimore & Ohio Railroad, some 30 years ago, where a side-hill fill gave way directly under the train, as in this case, and caused the loss of several lives.

That, however, was very soon after the line was opened, and thus reflected in some measure both on the engineers and on the maintenance department. In this case, if the testimony be correct, the fill had withstood the storms of nearly a quarter of a century untouched and intact. With both tracks almost wholly on the solid, and with an outside berme of 7 ft., made by the surplus excavation removed for double-tracking, what could seem more trustworthy?

In the apparently additional security of the added berme, however, probably lies the immediate, if not the only cause of the disaster. It is not difficult after the event to see this with tolerable clearness, and to see how a very little work would have prevented it, and it therefore carries a certain lesson for engineers. The original single track was only partly on the solid, but the bank was small and thoroughly compacted. Its weight, compared with the friction of its base, interlocked with the rocks on the original surface, was small. When the double track was laid, in 1884, it had stood so long that it is at least extremely unlikely that if it had not been added to, it would ever have given way bodily. It would appear from the evidence that the excavated material for the second track, as would be most natural and pardonable under the circumstances, was simply dumped over the side as quickly as possible, left to go where it would, no attempt being made to connect it with the old bank or consider its effect thereon.

Therein, in all human probability, lay the error. The effect was that there was a new bank of spoil, very imperfectly consolidated with the old, and resting on its steep slope. It needed but comparatively little to start this moving, and once started, it would of course be almost sure to carry the old bank with it. A very little work to make this spoil-bank more stable, we may now see would probably have averted the result; but let him throw the first stone who feels sure he would have taken that trouble.

Percolation of water may have been the immediate cause, but it seems more probable that it was the action of frost and thaw on the toe of the bank.

It is somewhat singular that an accident of this rare kind should have happened to occur on the only railroad in the United States owned and operated by a state. It was originally built by the state of Massachusetts, and is now maintained and officered by it. The Fitchburg and connecting roads run their trains over it, and do the business thereon under a peculiar arrangement by which about half the gross receipts go to the state and half to the corporations running trains over it; but the movement of trains is directed by the state's officials.

Under these circumstances, it is all but certain that the state will be legally responsible for the damages both to persons and property, and in a state like Massachusetts we might reasonably expect that no proper care of the property would be neglected for the sake of economy. Nor does it appear that it has been. Last year the state expended, on the 44 miles of the road:

For maintenance of way	$144,644,	$3,287 per mile
For maintenance of road-bed and track	96,073,	2,184 " "

The last item is exclusive of renewals of rails and ties, and it is certainly an ample sum. The Pennsylvania Railroad, which spends more on track than most other lines, spends only some $2,800 per mile for this purpose, and this includes a very large expenditure for "fancy" work, which we would not be understood to imply is therefore unwise—on the contrary, we believe most of it to be eminently wise—but which is not essential for safety. The average expenditure in the United States, for work on road-bed and track only, excluding rail and tie renewals and structures, is only $450 per mile, ranging from $574 in the New England and $621 in the Middle States to $361 in the Northwest.

This accident was not deadly enough to rank among

the famous ones, unless from the singularity of its cause, but that accidents of even this seriousness should be so rare, is certainly a remarkable testimony to the safety of railroad traveling, when we remember that something like 4,000,000,000 miles have been run by trains in the United States since Ashtabula. It is interesting and encouraging to run over the list of notably great disasters since that date, and see how few there are. The Revere accident, which killed 29 and injured 57, happened long before, Aug. 26, 1871, and was the worst in New England since the still remembered Norwalk draw-bridge accident, May 6, 1853, where 45 were killed (mostly drowned) and 30 injured. The Revere accident was the natural result of the most wretched mal-administration, and nothing quite so discreditable has occurred since, although the Wollaston accident, on the Old Colony, Oct. 8, 1878, 19 killed and 53 injured, was also due to negligence in operation. Less discreditable, but still discreditable, was the Jackson collision on the Michigan Central, killing 15 and injuring 29, mostly emigrants, which accident had the unique distinction of piling eight trucks under the body of one car and yet not awakening all the sleepers in the sleeping cars at the rear of the long train. Emigrants, it may be also added, have been singularly unlucky, since the first great slaughter of them at the Richelieu River bridge in Canada, in 1864, where an engineer ran into an open draw-bridge on a dead straight line in broad daylight, past a danger signal in plain view, killing 86. The last conspicuous instance of bad luck to emigrants is the collision in the "Meadows" near Jersey City, last year, where 9 were killed and 8 wounded.

A more recent collision of the discreditable class was that at Spuyten Duyvil, Jan. 13, 1882, where 8 were killed and 16 injured, and two others of a deadly character were the collision near Pittsburgh, on the Pennsylvania, Oct. 9, 1880, killing 32 and injuring 17, and at May's Landing, on the Philadelphia & Atlantic City, Aug. 11, of the same year, killing 28 and injuring 47, in both of which the horrors of escaping steam from numerous broken boiler connections were a chief cause of the great fatality, and ought to have taught a lesson which even yet does not seem to have been learned.

Besides these there have been one or two very fatal accidents to excursion trains, and possibly others, to none of which we can refer definitely, but since the end of 1880 there appears to have been no railroad accident of any kind so fatal as that of last week. It is encouraging indeed that this should be so. On the whole, we are advancing, though there remains a great way to go yet.

IMPORTANCE OF THE THROUGH TRUNK LINE TRAFFIC.

The New York *Tribune* this week has been trying to show that the through traffic for which the trunk lines compete is so small that it is hardly worth fighting about, and that fighting about it would not do much harm, except for its effect on local rates. In support of this position it cites the New York Central's report of through *tons* and *passengers*, showing 1,715,897 tons through last year to 9,087,060 local, and 142,034 passengers through to 12,605,767 local.

We have before shown how utterly inadequate such statements are to give any idea of the traffic for which the trunk lines compete. This traffic includes not only that which is through in the sense of passing over the whole length of a railroad, but also that which goes from or to any competing point in the East to or from a Western terminus of any trunk line, or to or from any point further West, often over parts of different railroads. In the case of the New York Central the traffic passing between New England and the West using the Central from Albany to Buffalo or Suspension Bridge, is subject to competition, and goes at through rates, precisely like the New York-Buffalo traffic, and to several points between Buffalo and Albany the through rates also apply, as on through traffic between the West and Philadelphia and Baltimore, using the Central only west of Rochester and Geneva. Even the New York-Buffalo freight, which was less than 16 per cent. of the total *tons* last year, was nearly 36 per cent. of the total *ton-miles* (755 millions out of 2,138 millions). In the one year that the company reported its Albany-Buffalo freight separately, it was very nearly the same in tons, and therefore two-thirds as much in ton-miles, as the New York-Buffalo traffic, and if that was so last year these two parts of the competitive thorough freight made 1,278 millions of the total 2,138 millions of ton-miles, or just about *three-fifths* of the whole. This is much the larger part of the freight on which through rates are directly applicable, yet not all. The through passenger traffic is a much smaller share of the whole, but it is comparatively more profitable when rates are maintained, the difference between through and local passenger rates, especially on this road, being much less than the differences between through and local freight rates.

There need be no mystery about the amount of freight which is governed by the through trunk line rates, for a complete record of it has been made and published for several years. Exclusive of live stock and dressed beef, the *east-bound* freight has been in tons:

1880.	1882.	1883.	1884.	1885.
10,483,374	9,875,217	10,060,304	8,862,037	9,807,113

This includes freight from competitive points all over the West as far as Chicago, Hannibal and St. Louis, which goes further east than the western terminus of the trunk lines (Buffalo, Pittsburgh, etc.), all of which is governed by the through rates and subject to the influences of a railroad war among the trunk lines, and much the larger part of which goes as far as a seaboard city or to New England. In 1882 less than one-fourth of this tonnage, and in 1883 26 per cent. went to stations further west—to interior New York, Pennsylvania, Eastern Canada and West Virginia.

The tons going through to the four Atlantic cities (New York, Boston, Philadelphia and Baltimore) and to New England for six years have been:

1878.	1880.	1881.	1882.	1883.	1884.
7,318,000	9,138,318	8,477,018	6,884,809	7,012,466	6,980,762

All this went from the western termini of the trunk lines, with a haul of 300 to 500 miles for every ton over these roads, besides what there may have been on their western connections, all carried at through rates.

The west-bound traffic from the seaboard cities and a number of interior points in New England which take Boston rates, and so with unimportant exceptions, passing over the whole length of the eastern trunk lines, has been, in tons:

1880.	1881.	1882.	1883.	1884.	1885.
1,871,770	2,120,205	2,369,896	1,890,259	1,920,845	2,045,635

This is very much less in amount than the east-bound freight, but it does not include shipments from interior New York and Pennsylvania points, corresponding to the east-bound shipments *to* those points, which make about a fourth of the total east-bound movement; and the average rates on the west-bound are probably not much less than twice as great as those on the east-bound freight, a much larger proportion being high-class freight. Thus reduction of rates in a railroad war may destroy very much more profit *per ton* than is possible with east-bound freight. Thus, the average rate on west-bound, which in 1884 was 46½ cents per 100 on the shipments of different classes actually made, was reduced to 24¾ cents last June, making a reduction of 21¾ cents per 100 lbs., which does not occur with east-bound freight, on which the average rate is probably not as much as 28 cents when the regular rates of recent years are maintained. A 15-cent rate (on grain and flour) below which the companies went last year only for a very short time, means an average of perhaps 18 cents for all east-bound freight, or a reduction of about 10 cents from the standard average, and it is probably true that in a railroad war like that of last year the sacrifice of profit is about twice as great per average ton on west-bound as on east-bound freight.

We have shown above that last year there were 12,432,000 tons of freight carried at rates based on the through New York-Chicago rates, and liable to be affected by a trunk line war, besides all the live stock and dressed beef shipments. This traffic is carried an average distance, probably, of as much as 750 miles, and a difference of 10 cents per 100 lbs. in the New York-Chicago rate means a difference of about 8¾ cents per 100, or $1.65 per ton, on all this freight. It is a mild railroad war that does not reduce rates more than this on the average, but this on all the freight above mentioned makes a difference of $20,500,000 in the *profits* of the railroads concerned, about half of which falls on the Eastern trunk lines, and the other half on their numerous western connections.

Data are lacking for any similar statement of the possible losses by trunk-line passenger war, but they certainly might amount to several millions, and an unprofitable rate on cattle and beef would add other millions, aside from the effect on strictly local traffic, which is considerable.

In 1881, during the railroad war, a statement was published giving the actual amount of through freight and the earnings from it on the four trunk lines, the New York Central, the Erie, the Pennsylvania and the Baltimore & Ohio, during the months of July and August, in 1880 and 1881. In July, the war rates affected only east-bound freight, and were 15 cents less per 100 in 1881 than in 1880; for about three-fourths of August the east-bound rates were about 45 per cent. less in 1881 than in 1880. The tons carried were nearly the same both years—2,005,139 tons in 1880 and 1,938,550 in 1881; but the earnings from them fell from $5,668,276 in 1880 to $3,576,681 in 1881, a decrease of $2,091,595 in two months on these four roads, due almost entirely to the railroad war on the freight (not including live stock), which was then, and is still, carried at the through rates of the trunk lines.

It is true that a railroad war is not likely to cause as large losses to any one road now as it did then. In the first place, there are more railroads carrying it, and no one gets so large a share of the whole. In the next place, through rates have never been as high since 1880 as they were during that year, and are never likely to be again. The whole business yields a smaller profit, and the profit is divided among more lines. But the traffic remains enormous, and the difference between war rates, like those of last year, and reasonably profitable rates, like those the companies are charging now, amounts in the aggregate to many millions of dollars, and the importance of harmony among the carriers of this traffic, therefore, is very great, and is altogether misrepresented by the statement that 9,087,060 tons of the New York Central's freight last year were "way," and only 1,715,897 tons "through."

There is, fortunately, at this time, little prospect that there will be any serious trouble about through rates. It is not possible to get high rates, and with the narrow margin of profit which present rates afford, traffic will probably be light, at least until after harvest. There is the compensation that the decrease in traffic is likely to be entirely in east-bound freight, which makes the excess in this direction less than usual, and makes possible a reduction in the movement of cars and trains nearly in proportion to the reduction in east-bound freight, and greater than the reduction in total freight. There are still many obstacles in the way of maintaining rates, and past experience indicates that trouble may begin when not expected; but the conditions, except the amount of traffic, now seem unusually favorable. But one of these conditions is a realizing sense among railroad men of the great importance of the through business, and the enormous losses which may follow an unwise policy and a needless antagonism.

Opposition to the Proposed British Railroad Legislation.

Nearly all the English railroad companies have been holding special shareholders' meetings to protest against the railway rates and charges bill recently introduced into Parliament by Mr. Mundella with a speech which we published two weeks ago. These meetings were addressed by the chairmen of the companies and usually by some shareholders, including some distinguished lawyers, and they have brought out probably in the best manner possible what objections the railroad proprietors have to the proposed legislation. The chief of these, and the ones urged by all the speakers, refer to the proposed revision of the maximum rates and fares which the special acts of the companies now permit them to charge. The shareholders say that these maximum rates are part of their contract with the country, and that it was in consideration of the authority to charge as much as these rates that the capital was subscribed for the construction of the railroads. That this authority was not to be revoked arbitrarily, they say is proved by a clause providing under what circumstances the maximum rates might be charged, which clause empowers the Treasury 21 years after the authorization of a railroad, if the dividends have for the three preceding years averaged 10 per cent. upon the capital, to reduce the scale of rates and charges, but not so as to reduce the dividends below 10 per cent. This would seem to be conclusive as to the intentions of Parliament, but for another clause which declares that notwithstanding all other provisions of what may be called the companies, "charters," the railroads shall not be exempt from the provisions of any general act relating to railroads which Parliament may pass, or from any future revision, under the authority of Parliament, of the rates of fare and charges prescribed in the charters.

This latter clause makes the position of the British companies seem much less strong than that of our companies seemed before the "Granger" decision—our companies in many cases having been granted the power to fix rates at their discretion by their charters, the Dartmouth College case having decided charters to be contracts, and the United States constitution forbidding the states to pass any law impairing the obligation of contracts. The proposed British law provides for a revision of rates in a way that

seems much less dangerous to the railroad companies than the methods followed in some of our states. The railroads and their customers are to be heard by a permanent government bureau (the Board of Trade), which employs many expert officers, and does not directly and exclusively represent the customers of the railroads; and this tribunal cannot of itself make any changes in the rates, but only recommend such changes to select committees of Parliament; and Parliament is sure to give much more consideration to the railroad interest than our Congress, or any of our state legislatures, not only because all the English railroad shares are owned in England, and every member of Parliament has numerous and influential constituents who are shareholders, but also because the railroad interest is always very largely represented in Parliament, there being, as the chairman of one of the companies said at a recent meeting, 150 railroad directors in the present Parliament. In most of our state legislatures where legislation affecting railroad profits is most common, not one member has any interest in railroad property, nor any considerable number of constituents who have, the railroads being owned almost exclusively by non-residents. It is evident from the tone of the English speeches, however, that the railroad men fear the recommendations of the Board of Trade would be unfavorable to them.

The Railway Commission seems not to be much objected to by the companies, though the chairmen usually protest against the abridgement of the right of appeal, except on points of law. Indeed many other objections are made to the bill, but not much stress is laid on them, and the companies apparently are disposed to accept the bill if it can be modified as to the revision of maximum rates, which seems very unlikely.

On the other hand, the Associated Chambers of Commerce, which have been pressing for some legislation of the kind, have sent a deputation to Mr. Mundella to suggest some amendments to the bill in the interests of shippers, which were very slight, however, and they indorsed it as "on the whole a large and statesmanlike measure, and satisfactory in its main provisions to the interests which they were called upon to defend." It is noticeable that during the conference of this deputation with Mr. Mundella, one of its members protested against the condemnation of "export rates" (lower from place of shipment to seaport on goods exported than for those consumed in England), and illustrated the occasion of them from his own experience: "His firm were shipping coals from Hull to Ghent (Belgium) at 10s. and 10s. 3d. per ton; the same coals could not be bought in Hull for general consumption at a lower price. But if his firm did not carry at that price, Belgian coal would be used, and the steamer employed by his firm in carrying the English coal would have to stop running altogether."

The British companies resist anything like change in the conditions under which they must act much more than ours, at this day, would think of doing, though the probability of any serious interference with them, such as would affect the profits appreciably, is very much less there than here. This is probably partly due to undue apprehension, but partly also due to the feeling that the railroad interest has considerable power in Parliament and among the people. When legislation is opposed by railroad companies here, usually the only persons heard of in connection with the opposition are a few of the principal company officers and their lawyers. The great body of railroad proprietors do not appear at all, and the feeling is apt to prevail that only some bloodless machine called a "corporation" has any objections to the measures, and not a considerable number of human beings who have property at stake, just like farmers, merchants and mechanics. Indeed, the absence of large numbers of shareholders at company meetings and of discussions by them on such occasions leads the public to look upon the companies as shadowy affairs, rather than as genuine associations of men and women engaged in business enterprises. If the companies were more democratic and less autocratic in their methods, the railroad interest would probably exercise a much greater influence in the community and in legislative bodies.

Though traffic has been resumed at East St. Louis and elsewhere where there has been interruption by strikes, the situation is by no means satisfactory, for there are indications that many men stand ready forcibly to prevent the running of trains, when they can do so without danger of immediate arrest. The resort to arms at East St. Louis last week was the natural result of the dallying with the mob which has characterized the whole trouble. It is safe to say if a sufficient police force had been employed when first the violations of the law began, so that men "killing" engines, and otherwise interfering with the running of trains would have been promptly arrested, there would then have been no bloodshed anywhere, and that all unlawful proceedings would have ceased immediately, and that there would have been nothing like the present inflammation of the passions of the strikers. In the first place, doubtless very few of these were disposed to commit unlawful acts; but when the reckless ones have performed them with impunity day after day, many who are usually law-abiding citizens are sure to join them; and when these have worked their will, in defiance of the law, unmolested for a time, the enforcement of it seems to them like tyranny. Men will not respect the law unless it is enforced, and enforced habitually and promptly.

We reported last week the shipments of freight of all kinds from Chicago, by the complete report, for the whole month of March, except the last day, and said that for the entire month the total might be as much as 190,000 tons. Actually it was 189,722 tons, and for eight years the total shipments in each of the first three months of the year, exclusive of those by the Chicago & Atlantic this year in March, have been:

Year.	January.	February.	March.	Three mos.
1879	192,512	198,541	258,458	650,511
1880	165,494	169,181	321,856	656,531
1881	267,646	207,790	222,573	698,009
1882	321,148	225,815	179,922	726,885
1883	271,162	225,031	308,354	813,748
1884	234,704	195,789	282,120	712,613
1885	322,073	259,371	366,517	947,941
1886	167,665	217,030	189,722	574,417

Thus, though in no one of the three months have the shipments this year been less than in any other; still, for the entire three months the shipments have been very much less this year than in the worst of previous years since the record has been kept. They were 11.7 per cent. less than in 1879, when they were the smallest till this year, and nearly 40 per cent. less than last year, when they were largest. Only in 1880, 1881, 1883 and this year were the rates well enough maintained to yield a decided profit on the business, though in nearly all these years the rates were profitable at the beginning of the year, and the demoralization came by degrees, though the reverse was the case in 1882.

The total east-bound freight movement over the trunk lines in March was not nearly so small as the Chicago shipments would indicate. Indeed, it was not small at all, but larger than in most other years—certainly larger than in any other except last year and the year before, and perhaps 1883, but not much different from those of 1880—the "boom" month of the "boom" year so far as trunk line freights are concerned. The complete figures are not yet at hand, but those for the first 26 days warrant the statement perfectly, that in no year *when rates were maintained*, except 1883, was the east-bound movement in March larger than this year. This, of course, means that the Chicago shipments have been an unusually small proportion of the total shipments this year. But this is only natural, because of the maintenance of rates just before the opening of navigation and the abundant supplies at the consumers' markets. This affects the shipments from Chicago and Milwaukee (most of the Milwaukee shipments go through Chicago and are included with its shipments), but not the shipments of the rest of the country to any important extent. The other shipments, however, are reduced by the expectation of a reduction of rail rates at an early day. It is important to understand that the course of the total freight movement eastward cannot be ascertained by the Chicago shipments. It never can be exactly, and just before and after the opening of navigation it can be still less, and when rail rates are decidedly higher than water rates, as they always are when they are high enough to pay, least of all can the total movement be judged from the Chicago movement.

The Mersey Tunnel.

On another page will be found illustrations and description of this great work, lately completed and opened for traffic between Liverpool and Birkenhea . The railway through the tunnel has convenient underground stations, situated under the principal thoroughfares and communicating by means of elevators with the surface. An interchange station with the existing railways is provided just outside Birkenhead, so that a business man can take the train from his suburban residence in the rustic wilds of Cheshire, and be whisked under Birkenhead and the muddy Mersey, and be delivered at his office door before he has quite made up his mind whether cotton is going "up" or "down." As Birkenhead occupies much the same position in regard to Liverpool that Brooklyn does to New York, it will be seen that the tunnel will afford thousands a chance of living in the country and working in the town.

The advantages to be gained by carrying a railroad in a tunnel under the Mersey at Liverpool are in many respects similar to those to be obtained by tunneling under the North River between New York and Jersey City. In both cases an immense passenger traffic has to cross a broad and deep harbor by means of ferryboats. The Mersey has a very swift tide, which rises and falls some 30 ft., and as dense fogs are frequent, the dangers, delays and inconveniences of crossing by ferryboat are perhaps greater than on the North River. The Mersey has, however, no floating ice in winter.

The Mersey tunnel is designed chiefly to accommodate local passengers. Through passengers for Birmingham, London and the South of England will continue to cross the Mersey by the existing London & Northwestern Railway bridge at Runcorn, 15 miles above Liverpool. A tunnel under the North River might, however, be used by an enormous number of through passengers, if suitable connections were made with the trunk lines from Jersey City.

It will be observed that in one essential point the Mersey tunnel differs from that already partly driven under the Hudson, and that built by the elder Brunel under the Thames at London. Both the latter tunnels are through the mud, the crown being but a short distance beneath the bottom of the river. The makers of these tunnels had therefore constantly to contend against the full head of water, which frequently broke in and flooded the works. In the Mersey and Severn tunnels, no such difficulties were encountered. These tunnels have been made through the solid rock, far beneath the bed of the river, and below any danger of serious percolation. The rock in each case proved practically water-tight, no water leaking from the river, though the Severn tunnel works were inundated by land springs. This distinction between tunneling in mud under a heavy head of water and tunneling in solid and practically water-tight rock is very important. The former process is a constant and uncertain struggle against immense difficulties and dangers. The latter is a simple and straightforward method of doing the work. The name of the elder Brunel will always be remembered among engineers for the courage, perseverance and ingenuity he showed in making his tunnel in the face of overwhelming difficulties. But the common sense of the engineer who overcomes these difficulties by avoiding them is also entitled to a meed of praise, and we, therefore, think that Mr. Brunless and Sir Charles Douglas Fox are entitled to great credit for the successful completion of this important work.

It is hardly necessary to point out that tunneling so far beneath the bed of the river involves long and steep gradients at each end of the tunnel. In the Mersey tunnel, the grades are no less than 166 ft. per mile, and the trains are to be worked by the enormous engines illustrated in the last issue of the *Railroad Gazette*, probably the largest engines ever used for passenger traffic.

The Mersey Tunnel Railway, between Liverpool and Birkenhead, seems already assured of great pecuniary success. It conveyed 200,000 passengers during the first week it was opened, and the receipts were at the rate of $400,000 per annum.

Chicago-St. Paul Rates.

The railroads between Lake Michigan and St. Paul in their contest over the traffic some two weeks ago came down to rates of 8 and 10 cents per 100 lbs. for all classes of freight, which is about equal to 18 and 22½ cents from New York to Chicago—lower than the lowest rates of last year's war, and especially destructive because the larger part of this traffic is west-bound merchandise, much of which usually commands five or six times these cut rates, although the whole amount of business is insignificant compared with that between New York and Chicago. It did not take many days of the 8 and 10 cent rate to satisfy the contending companies, and last week they attempted to make a new schedule, which was indeed unprecedentedly low for a regular schedule, ranging from 10 to 30 cents per 100 lbs., which is fully as low as trunk line rates between New York and Chicago, but which could not be maintained because the lines with little of the traffic objected that a large part of the traffic had been contracted for some time ahead at 8 and 10 cents. This is only one of scores or hundreds of cases in which companies have spoiled their business for long periods by giving certain shippers time contracts, or contracts for great quantities which will require a long time to ship, at very low rates; and an outsider with no money to lose is apt to have a sort of grim satisfaction at the struggles which the companies make to extricate themselves from the difficulties in which such contracts involve them, which they were perfectly aware of when they made the contracts. The burnt child fears the fire, but the railroads thrust one hand among the coals while the other is still smarting from a previous experience of the same kind.

It looks very much, however, as if there would be a permanent reduction in the rates between Chicago and St. Paul. Perhaps the main primary cause of the present trouble is the competition of the Lake Superior route. Unless the lines from St. Paul and Minneapolis to Lake Superior charge about as much for a haul of 155 to 200 miles as the lines to Chicago charge for a haul of 410 miles, there will be a strong tendency for much of the freight to go by way of Lake Superior—merchandise as well as wheat and flour. The Lake Superior lines cannot well do this, when rates between Chicago and St. Paul are as high as they have been hitherto, and if they do not, there is nothing left for the Lake Michigan lines but to reduce their rates. They have, in fact, to meet lake competition, which they have not felt seriously until recently. It will not be surprising if St. Paul and Minneapolis,

should become points with trunk-line rates—that is, with approximately the same rates per ton per mile as are charged from New York to Chicago, St. Louis, etc. This is a consummation devoutly to be deprecated by all the lines from Chicago westward; for if St. Paul has such rates, it will be very hard to prevent their extending further south to places as far west as Des Moines, and perhaps as far as Omaha and Kansas City, which heretofore have had rates similar to the St. Paul rates. The only companies which could see such a change with complacency are those whose lines are west of St. Paul, namely, the Northern Pacific and the Manitoba. The projection of Lake Superior 500 miles northwest of Chicago cannot fail to have an important influence on the rates of the railroads which carry eastward from its vicinity, and the more transportation on this lake is developed the more this effect will be felt. When goods are carried between Buffalo and Duluth for about as little as between Buffalo and Chicago, and about as quickly as between Buffalo and St. Paul, the railroads between Chicago & St. Paul must accept very low rates to receive any part of the through traffic.

The Economy of Compound Engines.

The compound engine is making rapid progress. A few years ago, compound engines were rarely used at sea, and were almost unknown on land. Now all marine engines and most large stationary engines are made on the compound principle. Triple expansion engines have proved an unqualified success on board ship, and compound locomotives are now in use on four of the largest English railroads and on many lines in France and Germany.

Mr. F. W. Webb's compounds with two outside high-pressure cylinders and one inside low-pressure cylinder have run some 3,000,000 miles with express trains on the London & Northwestern, and many engines on his principle have been built for South America and India. Mr. T. W. Worsdell's compounds with one high-pressure and one low-pressure cylinder side by side and inside-connected are running express trains on the Great Eastern Railway, and are doing well. Though at first careful competitive trials showed no economy over ordinary engines of similar size running precisely similar trains, yet further experience in their management and improvements in detail is claimed to have rendered them more economical that ordinary engines doing the same work. Mr. Worsdell is now building both freight and passenger compounds at Newcastle-on-Tyne for the Northeastern Railway. The Great Western Railway has just built some compound freight locomotives, the cylinders being on the tandem principle, as used in the well-known White Star steamers. On the continent of Europe many compounds are used, and careful and extended trials indicate that their consumption of fuel is fully 15 per cent. less than that of non-compound engines doing the same work. Most of these engines are on the systems either of M. Malet or of Herr von Borries, having one high and one low-pressure cylinder, both outside-connected.

Hitherto in compound engines the expansion of the steam has been conducted in two or three cylinders in succession, but in a steam yacht, the "Rionnag na Mara," recently built on the Clyde, the expansion is carried on in four cylinders in succession. Such engines are termed "quadruple expansion compounds," and full particulars of the remarkable economy attained by the use of this principle will be found in another column of the *Gazette* and will doubtless prove interesting to many of our readers. A consumption of 1¼ lbs of coal per indicated horse power per hour is something marvelous, and shows what rapid progress is being made in the development of the compound principle and what remarkable economy of fuel is attained.

It will be noticed that the ratio of expansion between the successive cylinders of the "Rionnag na Mara" is small. Neglecting the ports and clearances, the ratio of the three high-pressure cylinders to the cylinder into which they exhaust is as 1 to 1.74, or nearly 4 to 7—not a large degree of expansion. The latter cylinder in turn exhausts into the second intermediate cylinder, the ratio of expansion being very similar, 1 to 1.8, or say 5 to 9. The contents of this latter cylinder is to the final low-pressure cylinder as 1 to 2.4, or as 5 : 12.

These very moderate degrees of expansion give three very important advantages. One is that the pressure on the piston is tolerably equal throughout the stroke. This, in combination with three crank-pins spaced about 120 degrees apart, implies that the turning force is more nearly equal at any portion of the revolution, a point which deserves more attention from locomotive designers than it has received. Marine engineers attach considerable importance to this point, involving as it does lessened strain and wear and tear on the working parts. In locomotives, if the strain tending to turn the wheels was practically equal throughout a revolution, the tendency to slip would be greatly diminished. This point is likely to receive more attention in the future than in the past, especially as it seems probable that it is an advantage which can be obtained by the application of the compound principle to the locomotive.

The second advantage gained from the small ratio between the cylinders is that the range of temperature in each cylinder is reduced, a point essential to economy.

As the valves can be set to cut off at about half-stroke, a large port opening can be secured without excessive lead or premature release or compression.

It would therefore appear that the quadruple expansion engine will be both more durable and more economical than an ordinary compound engine, for the same reasons that the latter runs longer without repairs and on less fuel than the simple expansive engine.

The disadvantages of the compound are also obvious. An engine with six cylinders is heavier, more costly and more complicated than an ordinary compound or simple engine with two or three cylinders. At sea, the advantages have decidedly outweighed the disadvantages of the compound engine, and experience in Europe has convinced many that the same is likely to be true of the locomotives.

March Earnings.

The 28 railroads whose March earnings are given this week do not make so favorable a showing as the 25 which reported last week. Of the 25 last week, 17 were given as having an increase over last year, and the aggregate increase was given as $205,837, or 1.9 per cent. This week changes the statement for the Illinois Central, however, making a decrease on the Iowa lines as well as the other lines, and making the decrease on the other lines larger than then reported, which reduces the increase of the 25 roads to $143,724. The 28 reporting this week have in the aggregate an increase of only $34,458, or 0.6 per cent. The aggregate March earnings of the 53 railroads that have reported down to this time have been:

	1886.	1885.	Increase.	P.c.
Earnings	$17,128,613	$16,951,431	$177,182	1.0

The increase in earnings is not in proportion to the increase in mileage; but as the earnings were quite good last year, the result is quite as favorable as could have been expected.

Of the 28 roads reporting this week, 14 have an increase in earnings compared with last year, which on some of them is very large, as 17 per cent. on the Cincinnati, Washington & Baltimore, 20½ on the Denver & Rio Grande Western, 26¾ on the Flint & Pere Marquette, 49¾ on the Gulf, Colorado & Santa Fe (with an increase of 17 per cent. in mileage), 150 on the Ohio Southern (which was almost idle last year, earning but $122 per mile), and 18 per cent. on the Western North Carolina.

There are also some important decreases, as 11 per cent. on the Burlington, Cedar Rapids & Northern, 14 on the Louisville & Nashville, 24¾ on the Mobile & Ohio, 34 on the Ontario & Western (but with a decrease of 16 per cent. of its most productive mileage), 21 by the Main Line and 14¾ by the Belleville Line of the St. Louis & Terre Haute.

The March earnings of the more important of these roads is given below for the last five years:

	1882.	1883.	1884.	1885.	1886.
Can. Pacific		$297,00	$279,75	$183,876	$610,000
St P., M & Man	$536,937	740,113	702,041	576,011	59 ,000
Bur., C. R. & N.	224,107	252,913	217,349	272,389	211,913
Ill. Cent. in Iowa	167,554	204,943	142,159	154,082	155,700
Ill Cent. in Ill.	518,673	555,858	494,453	555,309	470,161
Peoria, Dec. & E.	65,423	59,710	69,74?	59,791	56,678
Ev. & T. H.	66,422	68,911	68,509	60,818	58,429
St L. A & T. H.—					
Main Line	101,747	133,093	125,129	113,951	89,655
Belleville Line	75,862	80,951	74,227	78,058	57,979
Flint & P. M.	199,814	233,366	218,759	155,108	199,563
Cin., W. & B.		164,748	175,102	152,674	178,079
Ohio South	26,841	33,614		15,596	38,946
K. C , Ft. S. & G.	147,458	174,4 2	213,897	214,910	207,211
K. C., Spring & M.			65,679	134,088	130,845
Grand Trunk	1,305,803	1,380,821	1,221,633	1,087,700	1,2 6,362
B., Hoosac T. & W.			36,983	41,137	47,623
Gulf, C. & S. F.	81,067	148,496	121,676	91,634	140,335
Ill. Cen., So Div	309,247	352,024	360,156	419,431	313,039
Mobile & O	148,167	194,845	185,275	190,956	143,971
Louisv. & Nash.	1, 68,834	1,141,537	1,187,738	1,281,516	1,100,9 5
Cin., N. O. & T. P.	199,567	227,475	283,273	208,957	34,021
Rich. & Danv.	339,467	352,414	356,129	360,502	302,6 0
C., Col. & Aug.	69,1 6	84,043	68,232	75,578	84,019
Col. & Greenv.	73,182	88,021	59,747	69, 62	78,56
Va. Midland	112,499	123,580	119,363	113,698	113,981
West. N. C.	18,548	26,167	31,034	38,536	45,606

The lines here are arranged geographically, beginning with the northwest, and going south and east, and then beginning with the southwest and going east. The Canadian Pacific has been increasing rapidly in mileage, and earned only $173 per mile this year, against $160 last year. The Manitoba's earnings, while a little more than last year, were much less than in 1883 and 1884. The Illinois lines of the Illinois Central earned less this year than in any other of the five, except 1884, the Peoria, Decatur & Evansville, the Evansville & Terre Haute and the Alton & Terre Haute all earned less this year than in any other of the five; the Flint & Pere Marquette much more than last year, but considerably less than in 1883 and 1884; the Cincinnati, Washington & Baltimore more than in any of the other three years; the Grand Trunk less than in 1882 and 1883, nearly the same as in 1884, and much more than last year. We now come to the Southern roads, March earnings of ten of which are given for the seven years. The Gulf, Colorado & Santa Fe, the only one west of the Mississippi, earned less in 1883, though it worked one-fourth more road, but it gains more every other year. Of the four great Southern roads between the Mississippi and the mountains, the smallest, the Cincinnati, New Orleans & Texas Pacific, earned more this year than ever before, but the other three earned less this year than in any other since 1882, and their decreases since last year are very large. The other five Southern roads reporting all belong to the Richmond & Danville system, they all earned more than last year, and two of them more than ever b fore.

Chicago through shipments eastward of flour, grain and provisions for the week ending April 10, excluding those by the Chicago & Atlantic Railway, were 18,937 tons this year, against 77,680 last year, and 83,302 in 1884, the Chicago & Atlantic shipments having been 14,351 tons in 1884 and 5,409 last year. The shipments of this week in 1884 were the largest ever made in a single week, and then and last year also they were more than four times as great as this year, when the shipments, allowing for the Chicago & Atlantic, were smaller than in any week last year except three, and smaller than in any week of any other year except 1882, when there were many weeks of smaller shipments after navigation opened. It is grain which shows extraordinary small shipments, for which there is now the double reason of the near approach of the opening of navigation and the general expectation of a reduction of rail rates very soon. This latter expectation checks the shipments of grain to interior points, which will have to be made by rail after navigation opens as well as before.

Most of the flour usually goes forward by rail, but probably not so much now as formerly, because a very large part of the flour comes from Minneapolis and points further west, which can be sent cheaply to Lake Superior ports, and will be unless the rail rates to Lake Michigan ports are very low. These rates last week were extremely low, but they have not brought forward much flour.

To show how entirely it is the freight which moves habitually by lake that has reduced the Chicago shipments, we give below the reported shipments of flour, grain and provisions for the week to April 10 for the last five years:

	1882.	1883.	1884.	1885.	1886.
Flour	5,377	4,962	15,025	22 108	5,083
Grain	17.475	20,085	70,407	54,188	7,843
Provisions	6,007	7,437	6,221	6,793	6,011

The flour shipments were not exceptionally small this year, but were exceptionally large last year and the year before, made so by the 15-cent rate, which was more advantageous than any lake rate would be, and so took what had been held for the opening of navigation, and in great quantities because it was uncertain whether the rate would not soon be advanced. They fell off very largely in the course of a few weeks. The grain shipments this year, however, were phenomenally small. Allowing for the Chicago & Atlantic they were probably only one-sixth as great as last year, not one-eighth of those of 1884, and only about half as great as in 1882, when the movement was very light. The grain movement is likely to continue light by rail, for there is no disposition to take grain at cost, and at any higher rate the lake and canal can secure nearly all the exports and the New York city consumption. The shipments to interior points in the East, however, and to seaboard cities other than New York, will make a much larger average amount than last week's shipments.

The provision shipments, which go almost entirely by rail, have not fluctuated much, and were but 3½ per cent. more this year than in 1884, when the grain shipments were 727 per cent. greater.

For the weeks of years previous to 1884 corresponding with last week the total Chicago shipments of freight of all classes, by the complete reports, were:

1880.	1881.	1882.	1881.
56,429	53,020	38,988	36.271

Allowing for the Chicago & Atlantic and the high class freights the total shipments this year were probably from 30,000 to 34,000 tons—not so very much below those of 1882 and 1883, but very far from those of 1880 and 1881. In 1880 the lakes were already open, and it was the last week of a 35-cent rate, supposed to have been well maintained; in 1881 the opening of the lakes was still distant, and it was the last week of a 30-cent rate, maintained by most lines but not by all, but covering probably much the larger part of the shipments.

Informal discussion of the subject shows a very strong inclination on the part of many Western railroad managers not to make any change in rates after navigation opens—about as many opposed as in favor of such a reduction. If one shall be made, as we presume there will be after the lakes open, it is a good time to change the practice of making changes as much as 5 cents per 100 lbs. at a time. On the present flour and grain rate a reduction of 5 cents is a reduction of at least one-half in the profit. Nothing but necessity can justify this in the present condition of railroad business. Again, it is hard to see why the opening of navigation should be the occasion of any reduction in rates on provisions, nearly all of which will go by rail unless the rate is much higher than it has been in recent years.

For seven successive weeks the total reported Chicago shipments and the percentage taken by each railroad have been:

	Week ending.—						
	Feb.	Mar.	Mar.	Mar.	Mar.	Apr.	Apr.
Tons:	27.	6	13.	20.	27.	3.	10.
Flour	4.972	3,966	5.684	4,985	5,650	5,221	5,083
Grain	30,000	34.023	19,086	14 757	16,502	11,490	7,843
Provisions	5,392	7,225	7,262	6,173	5,800	6,131	6,011
Total	40,364	45,214	32,637	25,915	27,952	22,910	18,937
Per cent.:							
C. & Grand T.	21.9	22.2	19.6	13.2	19.3	16 3	12.1
Mich. Cen	21.2	27.8	16.0	18.1	15.2	13.4	11 7
Lake Shore	9.4	17.6	26.1	21.8	31.7	26.5	17.4
Nickel Plate	16.9	2.7	4.1	12 2	5.2	8.3	6 4
Ft Wayne	10.5	10.6	11.7	15.4	12.4	15.1	20.8
C., St. L. & P.	9.7	6.1	9.5	7.2	5.8	7.6	13.3
Balt & Ohio	4.0	8.3	13.0	12.1	10.4	12 8	18.3
Ch. & Atlantic	6.4	4.7	....	....	....	....	....
Total	100.0	100.0	100 0	100.0	100.0	100.0	100.0

Omitting the Cnicago & Atlantic, the total shipments for eight weeks have been:

Week ending						
Feb. 20.	Feb. 27.	Mar. 6.	Mar. 13.	Mar. 20.	Mar 27.	Apr. 3.
45,424	37,796	43,076	32 637	25,915	27,952	22,910

The flour and provision shipments last week were about equal to the average of the six weeks previous, the decrease being almost wholly in grain. In the percentages (which are not now very significant), the sudden great increase of the Baltimore & Ohio and the two Pennsylvania roads (all being lines that carry to Baltimore) is noticeable, this being at the expense chiefly of the Chicago & Grand Trunk and the Lake Shore.

How extremely light the movement of wheat to the seaboard has been during the past winter may be known by the following statement of it for the 15 weeks ending April 3, in bushels:

1883.	1884.	1885.	1886.
14,268,588	5,925,961	8,949,395	2,977,922

This year they were but a third as great as last year, half as great as in 1884, and little more than a fifth of those of 1883. This year more barrels of flour than bushels of wheat were received at the seaboard, and though there was less than

in previous years, the decrease was small compared with the decrease in wheat. Reduced to bushels the flour for these 15 weeks amounted to:

1883.	1884.	1885.	1886.
19,673 073	15,010,177	17,405,460	13,627,075

thus, the decrease of flour since last year is 22 per cent., against 67 per cent. in wheat.

The Northwestern wheat receipts meanwhile have been much greater than the seaboard receipts—this year more than three times as great—but the flour receipts were less —27 per cent. less this year.

Again Duluth comes forward as the leading wheat receiver though at this season it has usually received either none at all or very little. For the week ending April 3 it received more than half of the total wheat receipts of the eight Northwestern markets, 386,528 bushels, out of 697,148. The total, it is true, was small, yet it was the largest for 12 weeks, and Duluth's receipts were the largest for 16 weeks. There is a larger stock in store there than anywhere else except Chicago, but not quite half so much as at Chicago—6,605,000 bushels against 14,197,000. At all other western markets together there are about 17,000,000 bushels, of which 6,289,000 are at St. Paul and Minneapolis.

The railroads from Chicago to the East long ago agreed to abolish hotel and outside ticket offices, which were regarded as multiplying the evils that adhere to the payment of commissions. Recently it was agreed to abolish the payment of commissions, but for the benefit of those lines which find it difficult to secure travel without commissions, it was agreed to open ticket offices at three principal hotels—the Grand Pacific, the Palmer, and the Sherman House—where tickets by all lines to the East will be sold *by a salaried agent*. The lines which have not a large established travel complained that without hotel offices they were at a disadvantage, because the hotels would send messengers for tickets for their guests to the offices of the principal railroads, by which many traveled, but not to those of the other roads, by which few traveled.

The two short lines between Chicago and St. Paul are about to put on really fast trains, making the run of 410 miles in 12 hours, from Chicago to St. Paul, between 7:30 p. m. and 7:25 a. m., and from St. Paul to Chicago between 7:30 p. m. and 7:55 a. m., which is five hours less than by the present trains. Thus the new trains will have a speed of 34 miles an hour, which is, we believe, faster than that of any passenger train over a long route west of Chicago.

The *Iron Age's* report of furnaces in and out of blast April 1 makes the total as follows:

	Charcoal.	Anthracite.	Bituminous.	Total.
In blast:				
Number	44	117	121	282
Weekly capacity, tons	6,766	33,280	64,821	104,867
Out of blast:				
Number	178	104	103	385
Weekly capacity, tons	17,334	22,234	33,787	73,345

Thus 59 per cent. of the total furnace capacity of the country was in blast April 1, being 65½ per cent. of the total bituminous, 60 per cent. of the anthracite and 28 per cent. of the charcoal furnace capacity. The average weekly capacity of the furnaces in blast was 372 tons; of those out of blast, 190 tons. The average capacity of the bituminous furnaces in blast is 535 tons per week; of the anthracite, 284 and of the charcoal, 154 tons per week.

The number and capacity of furnaces in blast has now been reported for the first of every month since 1885. The anthracite and bituminous capacity decreased until after September, having been, in tons, on the first of each month:

Jan	58,376	June	64,332
Feb	67,842	July	64,389
March	69,663	Aug	65,375
April	67,359	Sept	62,853
May	64,126		

From this lowest point the recovery has been great, as follows:

Sept	62,853	Jan. (1886)	84,010
Oct	63,552	Feb	85,354
Nov	68,371	March	84,535
Dec	76,606	April	98,101

Thus the increase during the month of March was greater than in any other one month since the recovery began, and, in fact, of the total increase of 35,248 tons of capacity per week in blast since August, no less than 13,566 tons (nearly two-fifths) was made in March.

This indicates a notable increase in the demand for iron, the furnaces in blast now being able to supply one-sixth more than those in blast at the beginning of the year, which were very little increased until March.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

North Pacific Coast.—Extended from Duncan Mills., Cal., north to Ingram, 8 miles.

Topeka, Salina & Western.—Extended from Herrington, Kan., west to Chico, 31 miles.

This is a total of 39 miles on 2 lines, making in all 445 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

	Miles.		Miles.		Miles.
1886	445	1881	819	1876	356
1885	275	1880	996	1875	196
1884	466	1879	391	1874	324
1883	911	1878	267	1873	566
1882	1,772	1877	267	1872	898

These figures include *main track only*, second or other additional tracks and sidings not being counted.

THE SCRAP HEAP.

An Astonished Locomotive Engineer.

A night or two ago, while locomotive No. 668, on the Chicago, Milwaukee & St. Paul road, was nearing Savanna, not far from Galena, an immense white owl suddenly came crashing right through the thick plate glass in the front of the cab. Engineer Wade rolled off his box in consternation; the head brakeman, who was in the fireman's seat warming himself, imagined that Old Nick was after the whole gang, and plunged out of the cab and over the coal-box with a whoop that would have done justice to a Sioux warrior, while the unfortunate and horrified McCarty caught the animal fair in his arms, fainting nearly from the effects of the shock. After a great deal of scratching and clawing on the part of the owl, he was stuffed into the tool-box and carried to Savanna and placed in the C., M. & St. Paul zoölogical garden at that place.

We understand that the C., M. & St. P. Zoölogical Garden had hitherto been confined to a collection of frogs, some of them being of enormous size, weighing some 300 pounds and measuring a yard or more in length.

Must Please Everybody.

Some idea of the difficulty experienced by railroad managers in endeavoring to accommodate the public may be gathered from the following, which is an exact copy of a letter received yesterday by A. A. McLeod, General Manager of the Elmira, Cortland & Northern:

"DEAR SIR: I sould like to know what in the name of all creation you have changed the time of the trains on your rhode for. Now I am a regguler travyellair on the rhode, and the trains went jest two suite me, and I want them changed back as they were befoar.

"N. N.—If you don't I'll go to law about it."—*Elmira (N. Y.) Advertiser.*

How to Acknowledge a Pass.

Never was railroad pass acknowledged so grandly as that forwarded by the Canadian Pacific to Crowfoot, the Blackfeet chief. This was the way he matched Homer, as translated by the Toronto *Railway Life:*

"Great Chief of the railway, W. C. Van Horne: I salute you, oh chief, oh great. I am pleased with railway key, opening road free to me. The chains and rich covering of your name writing, its wonderful power to open the road, show the greatness of your chiefness. I have done. Crowfoot."

Progress on the New Road.

"How are you getting along with the work?" asked a friend of the President of a recently organized Dakota railroad company.

"First rate; everything is moving along very satisfactorily."

"Glad to hear it. How many miles have you got graded?"

"Graded? Oh yes, I understand. Why, we haven't got any yet, but we've sold all our bonds and have declared three assessments on the stockholders without any of 'em kicking."—*Estelline (Dak.) Bell.*

The Brakeman Who Knew What to Do.

A number of years ago a stubby young man with a big mouth and solid looking head was taken on the Galesburg Division of the Chicago, Burlington & Quincy Railroad as a freight brakeman. He seemed to pay no attention to the sports indulged in by his fellow brakemen when off duty, but spent most of his time around the shops learning how to run engines and picking up information about the machinery of railroading. Of course, as a result of this, he had no particularly warm friends among those classes of railroad men who aim only to work just enough to earn their wages and no more.

One day a tall, clerical-looking man was riding in the caboose of the train on which this young man was employed. The tall man seemed to take a kindly interest in the young brakeman, who answered his questions courteously, but who did not permit the passenger to interfere in the least with his duty. Finally the train came to a standstill, and it was found that it had met another freight train at a station where the side track was not long enough to hold each train. The problem presented was: How were the trains to get by each other? In this day that would be solved very easily, but it so happened that at that time, when railroading was a different matter, neither conductor had encountered such a condition of affairs, and both supposed that one of the trains would have to back up to a station with a longer side track. As the conductors were discussing this the tall passenger and the young brakeman came up to them. When the young man understood the situation, he said to his conductor, respectfully:

"You can get by."

"How, I'd like to know?" said the conductor.

The young brakeman picked up a stick and marked out in the mud what is now known to every railroad man as "sawing by." The trains were sawed and went their way. The next day the young man was called to the Division Superintendent's office, where he met the tall passenger—Superintendent H. H. Hitchcock—and was taken into his more immediate employ, where he learned telegraphy and became a train dispatcher. In a short time the office of master of transportation was created and the young man given that place. From that day he has grown rapidly, and now the man who rides over the Chicago & Alton Railroad on the General Manager's pass reads the young brakeman's name at the foot of it—C. H. Chappell, General Manager.—*Chicago News.*

Mind Reading by Rail.

The following, a valued correspondent assures us, is a verbatim report of an actual occurrence in a parlor car on the Camden & Atlantic Railroad, a few days since, a few miles out of Philadelphia:

A dudish young man, in temporary charge of a bevy of young women, was confessing to their admiring ears that he had a remarkable faculty for telling where a man was born and even what his occupation was ard what he was thinking of. He "could not always do *that*," but he "hardly ever failed to tell where a man was born. Now that man," as the conductor entered the car, "*that* man is a Jerseyman."

"Conductor," continued the young man, airily, "I have guessed that you are a Jerseyman. Is'nt that so?"

The conductor allowed that it was.

"Oh! I was just sure of it. I can always tell what a man is, just by looking at him."

The conductor smiled blandly, and remarked that it was very strange; he had something of the same faculty himself.

"Is that so?" incredulously. "Well, now, what do you take me to be?"

"I *take* you to be a damp fool," answered the conductor, calmly, handing out his other hand for tickets.

The rattle of every joint was distinctly audible in one end of that car for several minutes.

TECHNICAL.

Locomotive Building.

The New York Locomotive Works in Rome, N. Y., are completing an order for locomotives for the Buffalo, New York & Philadelphia road.

The Baldwin Locomotive Works are building several Mogul freight engines, with Wootten fire-box, for the Lehigh & Hudson River road. They are also building a number of locomotives for the Wisconsin Central road.

The Car Shops.

The Wason Car & Foundry Co., in Chattanooga, Tenn., has recently received an order for coal cars for the Briarfield Coal & Iron Co., and has several other small orders on hand.

The Pullman Car Shops, at Pullman, Ill., have orders for street cars for Detroit, St. Louis and several other cities.

Bridge Notes.

Paquet & Smith, of East Portland, Oregon, have taken the contract for the bridges on 14 miles of the new Portland & Willamette Valley road from Dundee to the Tualatin River. There were 15 bids, all from parties on the Pacific Coast.

The new iron bridge built by the Louisville Bridge & Iron Co. at Nashville, Tenn., has been completed, tested and accepted. At the time of the test there were on the bridge a number of heavily loaded trucks and 1,260 feet of heavy wire cable; the total weight at one time being 548,750 lbs. Mr. G. Bouscaren, Consulting Engineer, made the tests and reported that the deflection of each span was from one-half to two-thirds only of that allowed by the specifications.

Iron and Steel.

Mr. W. Bailey Lang, for many years agent in the United States of the Low Moor Iron Co., of England, retired from business April 15. The agency will be assumed by Mr. E. Y. Jacobus, who will be sole agent of the company for the United States, and who will have his office in the Potter Building, Park Row, New York. The business for Boston and the New England states will be in charge, as heretofore, of Mr. W. D. Richards.

The Pennsylvania Steel Works at Steelton, Pa., in the month of March turned out 20,862 tons of Bessemer steel. The blooming mill bloomed during the month all the product of the Bessemer mill in addition to some ingots from the open-hearth furnace, making a total of 21,586 tons for the month. The heaviest output made in any one day was 926 tons in 24 hours.

The rolling mill of the North Chicago Rolling Mill Co. on April 2 turned out 746 tons of steel rails. On the day turn the mill rolled 1,606 and on the night turn 1,212 rails, all of 60-lb. section.

The Cambria Iron Co. in Johnstown, Pa., is changing its two Bessemer converters from 7 to 10 tons.

Millerton Furnace in Millerton, N. Y., has gone out of blast to make necessary repairs.

The Pittsburgh Steel Casting Co. in Pittsburgh is turning out about 100 tons of steel a day. The company recently received a heavy order for steel from an Eastern bridge building firm.

Citico Furnace in Chattanooga, Tenn., is running steadily and turning out about 90 tons of iron a day.

The experiments in the manufacture of steel from the Cranberry, N. C., ores have been commenced at the new steel works of the South Tredegar Iron Co. in Chattanooga, Tenn., and have been so far successful. Should these experiments succeed, the Roane Iron Co. will probably also start up its works in Chattanooga, making Bessemer steel from the Cranberry pig iron.

Manufacturing and Business.

The Jonson Foundry & Machine Co., whose works are at 118th street and Harlem River, New York, has contracted to build a cable railroad along 125th street, from the East River to the Fort Lee ferry, for the Third Avenue Railroad Co. The Jonson Co. is to supply everything requisite ready for the running of the road, and is to begin work on the contract at once.

The Kalamazoo Railroad Velocipede Co. writes: "We are filled up with orders at present, and shall have to run our factory night as well as day for at least four months from April 1 to catch up."

Messrs. Watson & Stillman, makers of hydrostatic machinery, engines, etc., have purchased the tools and business of the late Wm. Munzer, and on May 1 will consolidate their shops at 204 to 210 East Forty-third street, New York, with increased room and facilities.

The Cummer Engine Co. of Cleveland, O., has applied to the Supreme Court of Ohio to change its name to the Prospect Machine & Engine Co. The reason of the change is that the company is about to extend its business and desires a more comprehensive name.

The Standard Underground Cable Co., of Pittsburgh, reports that its business is increasing rapidly increasing, and that it has received orders, in the past few days, from a number of places, including contracts for the Underground Electric Light and Power Co., of Philadelphia; the Wander & Abbott Electric Light Co., of Chicago; the Chicago Telephone Co.; the Central Union Telephone Co. and the Commercial Quotation Co., of Chicago; the Cumberland Telephone Co., of Nashville, Tenn.; the Detroit Telegraph and Telephone Co.; the fire department of St. Catherines, Can.; J. R. Lee, of Houghton, Mich.; the Commercial Cable Co., of New York, and the United States Torpedo Station at Newport, R. I. The company is now busily engaged in filling orders.

The Rail Market.

Steel Rails.—The market is quiet but firm and quotations continue at $35@$35.50 per ton at eastern mills for rails of ordinary section, the higher quotation being for small lots. It is stated that $34.50 has been offered and refused on some large orders.

Rail Fastenings.—Quotations are firm at 2.40 cents per lb. for spikes in Pittsburgh; 2.80@3.25 for track-bolts and 1.70@1.80 for splice-bars.

Old Rails.—The market for old iron rails is dull, with very little demand. Quotations are $20@$21 per ton at tidewater with no takers, and lower prices are looked for. Old steel rails are quoted at $21@$22 per ton in Pittsburgh, with few sales.

Petroleum as Fuel for Boilers.

The steamboat "Sonoma," running on the Ohio River, has been fitted with the Archer furnace for burning crude petroleum. The boat is now making a trial trip from Cincinnati to St. Louis. On the run from Cincinnati to Louisville, the furnace worked very well, and in 150 miles used 4 barrels of oil. The "Sonoma" is a 200-ton boat, with the usual boiler and engine power for boats of her size. Arrangements are now being made to try the Archer system of burning oil in a locomotive boiler.

Progress on the Croton Aqueduct.

The Ingersoll Rock Drill Co., of New York, has issued a sheet containing a map and profile of the new Croton Aqueduct and tables showing the number of feet made in each of the 56 headings each week, from October, 1885, to Feb. 27, 1886.

The Bush Interlocking Bolts.

The Bush interlocking track-bolts are being used on the Boston & Lowell four-track swing-bridge over the Charles River. As this bridge, like most of the swing bridges near Boston, is of the folding type, no cross ties can be used, and

the fastenings to longitudinal timbers alone preserve the gauge. It is, therefore, essential that the fastenings should be secure. We understand that the Bush bolts, complete with clips, will weigh four tons less than the fastenings they replace, and are fixed with less labor. This is very strong testimony to their efficiency, and also shows that they are considerably cheaper than any other *equally efficient* fastening.

Blast Furnaces of the United States.

The *American Manufacturer*, of Pittsburgh, says in its issue of April 9: "We recommence in another column the publication of monthly reports of the condition of the blast furnaces of the United States with respect to them being in or out of blast, and their weekly capacity. For the report for this month we are indebted to the courtesy of the *Iron Age*. Hereafter the report will be made in our own office by our editor, who was the first to begin their compilation, January, 1874, the first of these reports appearing in the *Manufacturer* for Jan. 8 of that year.

"In a condensed form the table makes the following showing as to the condition of the furnaces of the country April 1, 1886:

	In blast.		Out of blast.	
Fuel.	No	Weekly capacity.	No.	Weekly capacity.
Charcoal	44	6,766	178	17,324
Anthracite	117	33.280	104	22.234
Bituminous	121	64,821	103	33,787
Total	282	104,867	385	73,345

"A comparison of this table with those giving the condition of the furnaces at the beginning of each month the present year shows a decided increase in the number of stacks in blast April 1 over that of any previous month the present year. On Jan. 1, 104 anthracite stacks, with a weekly capacity of 29,811 tons, were in blast. This increased to 117 stacks with a capacity of 33,280 tons April 1. On Jan. 1, 1886, there were 114 bituminous stacks blowing, with a capacity of 54,199 tons. This had increased April 1 to 121 stacks with 64,821 tons capacity—about 20 per cent. increase in capacity. This increase in bituminous stacks, it should also be noted, in view of the reduction of production in February and March, the result of the coke strike, will make the production of April much greater relatively than it was in February and March, and the same is true of the anthracite stacks using coke as a mixture, for it is conceded that the production of iron in a furnace using both coke and anthracite is greater than when running on anthracite alone. In estimating the probabilities as to increase or decrease of stocks, herefore, this should not be forgotten. We are of the opinion that the report for May 1 of coke iron stocks will show a considerable increase, as those of March 1 showed quite a reduction.

"A comparison of the condition of the furnaces of the country at the beginning of the present quarter with that of a corresponding date a year ago shows the remarkable change that the year has brought about. The following table gives the number and capacity of the furnaces in blast only on April 1, 1885 and 1886:

	April 1, 1885.		April 1, 1886.	
Fuel.	No.	Weekly capacity.	No.	Weekly capacity.
Charcoal	48	7,481	44	6,766
Anthracite	82	21,704	117	33.280
Bituminous	90	45 655	121	64,821
Total	220	74,840	282	104,867

"There has been a reduction both in the number and capacity of charcoal furnaces in blast, an evidence, if any were needed, that this industry is a declining one. The increase during the year in the capacity of the anthracite and bituminous furnaces in blast, however, is 50 per cent., the increased capacity of the anthracite being a little over 50 per cent., and of the bituminous a little less. It is questionable if the increase in the demand, even if it does now, will long continue to absorb the increased production.

"The following table gives the number of furnaces in blast on April 1 for each year from 1877, with the weekly capacity for the same:

	Charcoal.		Anthracite.		Bituminous.	
Date.	No.	Capacity.	No.	Capacity.	No.	Capacity.
1877	57	5,025	82	18,240	79	19,875
1878	60	5,001	97	19.410	95	23 644
1879	68	6 256	89	19,954	84	25,763
1880	102	8,842	189	40.096	140	39,472
1881	139	13.505	159	35,089	155	48,410
1882	132	13,506	175	38,566	150	52,027
1883	98	11 032	156	37 216	121	48,201
1884	62	8,713	107	27 612	100	49,236
1885	44	6,766	117	33,280	121	64,821

"The excess of the capacity of the furnaces in blast on the first of the present month over that at any similar date during the period covered by this table will be remarked. This capacity is 12,800 tons in excess of that in any previous year, or nearly 25 per cent. greater than in 1882, the year of the largest capacity previous to the present and more than three times greater than in 1877."

New Tunnel Work.

All the necessary preparations are being made for driving the Cascade Tunnel for the Northern Pacific Railroad in Washington Territory with the latest improved machinery and appliances. Mr. Nelson Bennett, who was recently awarded the contract, is now busily engaged in setting up the plant of Ingersoll machinery. The tunnel will be 10,000 ft. long and will be driven from both ends simultaneously. Ingersoll drills will be used in the headings and on the benches, and the work will be lighted throughout by electricity. The progress of this work will be watched with interest as some pretty fast driving is expected.

W. A. Douglass & Co., of New York, have secured 25 miles of the work recently let on the new Colorado Midland Railroad. Their section lies just west of Leadville and includes a 2,200 ft. tunnel 16 by 18 ft. long in section, at an elevation of 11,000 ft.; also two smaller tunnels. The contractors will start work on the large tunnel immediately, and a complete plant of Ingersoll machinery, consisting of "Eclipse" drills, "Straight Line" air compressors, boilers, etc., is already on the way to Colorado.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Central of New Jersey, annual meeting, at the office in Jersey City, May 7.

Delaware & Hudson Canal Co., annual meeting, at the office in New York, May 11, at noon.

Lake Shore & Michigan Southern, annual meeting, at the office in Cleveland, O., May 5.

Michigan Central, annual meeting, at the office in Detroit, Mich., May 6.

New York Central & Hudson River, annual meeting, at the office in Albany, N. Y., April 21.

New York, Susquehanna & Western, annual meeting in Jersey City, N J., May 6.

St. Louis & San Francisco, annual meeting, at the office in St. Louis, May 12; also a special meeting to vote on the lease of the Kansas City & Southwestern road.

Vicksburg & Meridian, annual meeting, at the office in New York, May 3, at noon.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Concord, 5 per cent., semi-annual, payable May 1, to stockholders of record on April 14.

St. Paul, Minneapolis & Manitoba, 1½ per cent., quarterly, payable May 1.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *Railroad Department of the Young Men's Christian Associations* will hold the fourth International Conference in Milwaukee, Wis., beginning at 7:30 p. m. on Thursday, May 6.

The *American Society of Mechanical Engineers* will hold its next meeting in Chicago, on Tuesday, May 25.

The *Master Car-Builders' Club* will hold its regular monthly meetings at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.

The *New England Railroad Club* will hold its monthly meetings at its rooms in the Boston & Albany passenger station in Boston, on the evening of the second Wednesday in each month.

The Western Railway Club will hold its regular monthly meetings at its rooms, No. 103 Adams street in Chicago, on the third Wednesday in each month.

Transportation in Congress.

The House of Representatives has passed bills authorizing the building of bridges over navigable waters, as follows:

Across the Mississippi River near Alton, Ill.

Across the west channel of the Detroit River to connect Belle Isle Park with the main land.

Across the Tennessee River by the Nashville, Jackson & Memphis Railroad Co.

Across the Mississippi River near Keithsburg, Ill.

Across the Illinois and Des Moines rivers by the New York & Council Bluffs Railroad Co.

Over Bayou Barnard, Miss.

Across Red River near Brown's Ferry, Tex.

Across the St. Croix River at some accessible point between Prescott, Wis., and Taylor's Falls, Minn.

Across the Mississippi River at Winona, Minn.

Across the Missouri River at St. Joseph, Mo.

Across the Missouri River at Council Bluffs, Ia.

Across the Missouri River at Saline City, Mo.

Across the Kansas River by the Inters-tate Rapid Transit Co.

Across the Missouri River in Clay or Jackson County, Mo.

Across the Missouri River above St. Charles, Mo.

Across the Yellowstone River, Montana.

Across the Mississippi River at Red Wing, Minn.

Across the Missouri River near Atchison, Kan.

Across the Tombigbee, Warrior, Tennessee, and other navigable rivers in Alabama by the Gulf & Chicago Air-Line Railroad Co.

Across Young's Bay, Oregon.

Across the Missouri River near Chamberlain, Dak.

Across the Missouri River at Piere, Dakota.

Southern Association of General Passenger & Ticket Agents.

The Southern Association of General Passenger & Ticket Agents met in Charleston, S. C., April 7. Owing to the absence of a number of the members, several of whom were detained by the freshets andother interruptions to traffic on Southern lires, no business of importance was transacted, but the Association adjourned to meet in Cincinnati, April 15.

General Time Convention.

The General Time Convention met in Cincinnati, April 14 pursuant to call. Mr. George Parker was chosen President; R. R. Bridgers, Vice-President, and W. F. Allen, of the *Official Guide*, Secretary. It was resolved to make no changes in the existing schedules for through trains, and to leave local time-tables to the several roads. May 2 was chosen as the time when the summer time-tables are to go into effect.

ELECTIONS AND APPOINTMENTS.

Addison & Northern Pennsylvania.—The following circular is issued under date of April 12, and signed by T. C. Platt, Receiver:

"1. The undersigned has been appointed Receiver of the Addison & Northern Pennsylvania Railway Co. and its property by the Supreme Court of the state of New York, and has accordingly taken possession thereof. The office of the Receiver is at No. 82 Broadway, in the city of New York.

"2. Mr. Frank M. Baker is continued in his position as General Superintendent under the Receiver, and all persons are requested to recognize his authority.

"3. Agents will remit all receipts to Thomas C. Platt, Receiver, 82 Broadway, New York, by United States Express."

Allegheny Valley.—At the annual meeting in Pittsburgh, April 13, the following directors were chosen: John Scott, George B. Roberts, David A. Stewart, A. J. Cassatt, Charles E. Speer, John P. Green, N. Parker Shortridge, Edmund Smith, J. N. DuBarry.

Ashtabula & Pittsburgh.—This company (whose road is leased to the Pennsylvania Co.) has elected directors as follows: Henry Hubbard, H. L. Morrison, Caleb B. Wick, W. Scott Bonnell, Warren Packard, F. Harrington, W. P. Shinn, Thomas D. Messler, W. H. Barnes, William Thaw, William Mullins, John N. Hutchinson, George Tod. The board elected John N. Hutchinson President; Frank Semple, Secretary and Treasurer; A. F. Hubbard, Assistant Secretary and Assistant Treasurer.

Boston, Hoosac Tunnel & Western.—Mr. C. A. Coombs is appointed General Manager, with office at Mechanicsville, N. Y., in place of H. L. Morrill, resigned. Mr. Coombs was recently Superintendent of the Knox & Lincoln road.

California Railroad Commission.—Mr. Stafford H. Parker is appointed Secretary of the Commission in place of W. R. Andrus, removed.

Central, of New Jersey.—Mr. James A. Roosevelt, of New York, has been chosen a director in place of J. Kennedy Tod, resigned.

Chicago & Great Southern.—Mr. L. S. Graves is appointed Car Accountant, with office at Attica, Ind. He was recently on the Chicago & West Michigan.

Chicago & West Michigan.—Mr. W. A. Carpenter is appointed Traffic Manager, with headquarters at Muskegon, Michigan.

Cincinnati, Washington & Baltimore.—At the annual meeting in Cincinnati, April 14, the following directors were chosen: J. L. Keck, J. D. Lehman, W. W. Peabody, Orland Smith, Cincinnati; W. T. McClintick, Chillicothe, O.; Robert Garrett, John Carroll Walsh, Baltimore; E. R. Bacon, New York. The board re-elected all the old officers.

Council Bluffs & St. Louis.—Receiver Thomas McKissock has appointed Mr. W. H. Shelby Superintendent of Motive Power and Car Department and also of water and fuel supplies, with headquarters at Stanberry, Missouri.

Danville & Northwestern.—The officers of this new company are: President, J. E. Schoolfield; directors, W. W. Berry, Francis X. Burton, B. S. Crews, T. B. Fitzgerald, W. B. Towns, E. H. Willer. Office in Danville, Virginia.

Detroit, Lansing & Northern.—Mr. W. A. Carpenter, heretofore General Freight Agent, has been appointed General Traffic Manager, with office in Detroit, Michigan.

General Time Convention.—The officers chosen by this body at its meeting in Cincinnati, April 14, are: President, George Parker; Vice-President, R. R. Bridgers; Secretary, W. F. Allen.

Kansas Railroad Commision.—Mr. A. Gillette, of Emporia, has been chosen a member of the Railroad Commission of Kansas.

Lehigh Valley.—Mr. T. F. Klase has been appointed General Eastern Freight Agent of this road, in place of Mr. A. H. Fatzinger, deceased. Mr. Klase has heretofore been General Agent at Philadelphia.

Long Island.—At the annual meeting, April 13, the following directors were elected: Austin Corbin, Edward Tuck, Alfred Sully, J. P. Townsend, William P. Kendall, Daniel C. Corbin, J. D. Campbell, J. Rogers Maxwell, Demas Barnes, Henry W. Maxwell, Henry Graves, F. W. Peck, J. G. K. Duer.

Macon & Dublin.—At the annual meeting in Allentown, Ga., March 31, the following directors were chosen: D. M. Hughes, Hardy Smith, John F. Burke, John M. Stubbs, D. G. Hughes, Arthur Pou, J. G. Gates, Joshua Walker. A meeting of the directors was then held and the following officers chosen: D. M. Hughes, President; Hardy Smith, Treasurer; Iverson L. Hunter, Secretary.

Manitoba Southwestern.—At the annual meeting in Winnipeg, Man., recently, the following directors were elected: D. A. Smith, R. B. Angus, W. C. Van Horne, J. M. Egan, J. A. M. Aikins, J S. Aikins, D. M. Telford, J. H. McTavish and C. V. Howell. The officers elected by the board are: D. A. Smith, President; J. M. Egan, Vice-President; J. H. Van Zile, Secretary By-laws were passed changing the head office to Montreal, but reserving the power to hold meetings in Winnipeg.

Missouri Pacific.—The directors have elected Jay Gould President; George J. Gould, Acting President; H. M. Hoxie, First Vice-President; A. L. Hopkins, Second Vice-President; A. H. Calef, Secretary and Treasurer; George C. Smith, Assistant Secretary; Guy Phillips, Second Assistant Secretary; D. S. H. Smith, Local Treasurer.

Mr. James Cahill, who has been a conductor on this road, has been appointed Assistant Trainmaster, with headquarters at Kansas City.

Monocacy Valley.—The incorporators of this company are: Charles E. Cassell, John Kunkel Steiner Schley, Leonard R. Walsh, Mechanicstown, Md.; John K. Wilson, Baltimore.

New York, Lake Erie & Western.—The office of Comptroller, lately held by Mr. S. Little, has been abolished, and the Accounting Department will be in charge of Third Vice-President Andrew Donaldson. Mr. W. Farrington is appointed Auditor.

Painesville, Wooster & Ohio.—This new company has organized by electing the following directors: Albert E. Boone, Gideon E. Meigs, Frank N. Wedge, Robert H. Cochran, Henry Cassell, John Bane, William A. Cassell, David B. Gary, Jr., John Bane. The board elected these officers: Albert E. Boone, President; Gideon E. Meigs, Vice-President; Rufus C. Burton, Secretary; Frank N. Wedge, Treasurer; John Bane, Auditor.

Pennsylvania Company.—Mr. E. A. Dawson is appointed Western Superintendent of the Union Line. He will have the supervision of the western agents and business of the line, under the direction of the Western Manager, and perform such other duties as may be assigned to him from time to time by the Western Manager of the Union Line, or by the First Vice-President of the Pennsylvania Company. His office will be located in Columbus, Ohio.

Red Wing & Iowa.—At a meeting held in Red Wing, Minn., April 8, the following officers were chosen: President, S. B. Fort; Vice-President, Charles Betcher; directors, E. W. Brooks, H. E. Hoard, S. M. Hodgman, J. C. Pierce, T. K. Simmons, G. R. Sterling; Secretary, W. C. Williston; Treasurer, J. C. Pierce.

St. Louis, Kansas City & Colorado.—At the annual meeting in Fort Scott, Kan., recently, the following directors were chosen: Francis Tiernan, E. R. Stewart, L. M. Potter, N. K. Elliott, W. S. McWilliams, W. S. Stout, W. Chenault, Robert Popkess and C. E. Emeret. The board elected Francis Tiernan, President; E. R. Stewart, Vice-President Robert Popkess, Secretary; W. Chenault, Treasurer.

St. Louis & San Francisco.—Mr. John G. Taylor is appointed General Live Stock Agent, with office in St. Louis.

Savannah, Dublin & Western.—Mr. A. B. Linderman is President of this company. Mr. Arthur Pou is Chief Engineer, with headquarters in Macon, Georgia.

Southern Pacific Co.—Mr. J. A. Fillmore, General Superintendent of the Pacific System, announces the following changes: G. W. Coddington, Superintendent Visalia Division, with headquarters at Tulare, Cal., in place of W. W. Prugh, resigned; J. H. Whited, Superintendent Truckee Division, headquarters at Wadsworth, Nev., in place of G. W. Coddington, transferred; J. A. Muir, Assistant Superintendent Los Angeles, Yuma, Wilmington, San Diego and Los Angeles & Independence divisions, headquarters Los Angeles, Cal., in place of I. H. Polk, resigned; J. S. Noble, Superintendent Gila and Tucson divisions, headquarters Tucson, Ar., in place of J. A. Muir, transferred.

Toledo, Columbus & Southern.—Mr. C. C. Gridley has been appointed General Freight and Ticket Agent in place of R. F. Wilson. Mr. T. H. McLain has been appointed Auditor and Car Accountant.

West Shore.—Mr. W. G. Watts on is appointed Car Accountant in place of D. W. Powell, resigned.

PERSONAL.

—Mr. W. W. Prugh has resigned his position as Superintendent of the Visalia Division of the Southern Pacific line.

—Mr. I. H. Polk has resigned his position as Assistant Superintendent of the Los Angeles and Yuma divisions of the Southern Pacific road.

—Mr. James D. Hollister has resigned his position as superintendent of the Florida Southern Railroad, to take effect May 1. Mr. Hollister has been connected with the road since its first organization.

—Mr. Merritt Seely, Superintendent of the National Express Co., died April 8, from injuries received in the accident at Bardwell's Ferry, on the Troy & Greenfield road, on the previous evening. Mr. Seely was widely and favorably known.

—Mr. T. H. Cooper, Superintendent of the Toronto Division of the Grand Trunk Railroad, died at his residence in Toronto, Ont., April 5. He had been in the service of the Grand Trunk road for 23 years past, and was at one time General Agent in Boston.

—Mr. H. S. Bryan, who was recently appointed Master Mechanic of the Chicago, Burlington & Northern road, has been presented with a handsome gold watch by the officers and foremen recently under his charge in the Chicago, Burlington & Quincy shops at Aurora.

—Mr. Washington A. Roebling, the late candidate for President of the American Society of Civil Engineers, who was defeated, together with the rest of the regular ticket, by an opposition ticket headed by Henry Flad, of St. Louis, has resigned his membership in the society.

—Mr. George B. Butler, who died in New York, April 13, aged 77 years, was best known as editor and one of the proprietors of the *Journal of Commerce*, and later as a lawyer. Mr. Butler was Secretary and Attorney of the Hudson River Railroad Co. when it was first organized, and held that office for several years.

—Mr. Charles P. Manning died at his residence in Baltimore, April 6, of pneumonia. Mr. Manning was a civil engineer who had been employed for a number of years on Southern lines. He was Chief Engineer in charge of the construction of the Alexandria, Loudoun & Hampshire, now the Washington, Ohio & Western.

—Mr. O. Chanute, formerly Chief Engineer of the New York, Lake Erie & Western, and the chief author of the able and exhaustive report of the Committee of the American Society of Civil Engineers on the Preservation of Timber, has interested himself in the work of tie-preserving, having erected works at Las Vegas, N. M. He is also now engaged in constructing similar plant at Laramie, Wyo., and at Chicago for various parties.

—Mr. Joseph D. Weeks, well-known to all who are connected with the iron trade, and who has for some time past been connected with the United States Geological Survey, has severed his connection with the *Iron Age* in New York, and has taken charge as editor of the *American Manufacturer* of Pittsburgh. Mr. Weeks returns to the *American Manufacturer* after an absence of 10 years, having had editorial charge of its columns for a considerable period.

—Mr. E. V. Cherry, of the well-known firm of Post & Co., manufacturers of railroad supplies in Cincinnati, is now one of the City Fathers of that town, having been last week elected Alderman of the First District. Mr. Cherry was one of the representative men in the movement made in that city in favor of reform in municipal business, which was successful in the recent election, and will doubtless apply to the affairs of the city the business ability and energy for which his firm have long been noted.

—Mr. George Biddle, a well-known lawyer of Philadelphia, died at his residence in that city, aged 42 years. Mr. Biddle was a graduate of Yale College, and studied law in his father's office in Philadelphia, and was associated with his father, an eminent lawyer, in a number of railroad and corporation cases. Although still quite a young man, he had made quite a reputation from his knowledge of corporation law. He was at one time counsel for the New York, Lake Erie & Western Co., and at the time of his death was counsel for the Philadelphia & Reading reorganization trustees.

—Mr. Gustav Lindenthal, C. E., the well-known bridge engineer of Pittsburgh, Pa., has brought suit against S. L. Smedley, as City Engineer of Philadelphia, for alleged appropriation of a design for remedying the defects of the foundations of the Chestnut street bridge contained in a proposal by Mr. Lindenthal (which was rejected) for doing the work. Mr. Lindenthal claims that the substance of his plan was appropriated from his proposal and carried out without compensation to him, and that the rejection was not *bona fide*, no plan similar to his having been previously contemplated. Mr. Smedley denies this. The trial comes off in August.

—Mr. Thaddeus Fairbanks, the last survivor of the original members of the widely-known firm of E. & T. Fairbanks, died at his residence in St. Johnsbury, Vt., April 12, aged 90 years. He was born in Shelburne, Mass., but removed to St. Johnsbury with his father when still a boy. In 1824, in partnership with his brother, he established a foundry in St. Johnsbury, principally for the manufacture of plows and stoves. Mr. Fairbanks early manifested much mechanical ability, which was shown in many improvements made in the work turned out from his foundry, and in 1831 he devised and patented a scale, which came rapidly into use, superseding the devices previously employed for weighing. The first scale patented was followed by many others, and the great business of the Fairbanks firm was gradually built up. Mr. Fairbanks was not an extensive investor in railroad property, but he took an active interest in the building of the Connecticut & Passumpsic Rivers road, and later of the Portland & Ogdensburgh and its Vermont division, both of which pass through St. Johnsbury and directly assisted his business. He was at different times a director in both companies.

—Hon. John Welsh, who died at his residence in Philadelphia, April 10, aged 80 years, was for many years one of the best known and most esteemed citizens of that city. Mr. Welsh was born in Philadelphia and at an early age entered into business in that city, forming after a time a partnership with his brothers in a firm which still exists. He gradually acquired a considerable fortune and became well-known on account of his public spirit and his active participation in benevolent and educational movements. When the Centennial Board of Finance was created Mr. Welsh was one of its members and was elected President, which position he held until the board was finally dissolved, and to his labors are largely due the success of the Centennial Exhibition of 1876. He declined all compensation for his labors and when a testimonial subscription of $50,000 was offered him by his fellow citizens in recognition of his services he requested that it be applied to the endowment of a professorship in the University of Pennsylvania. He served as Minister to England from 1877 to 1879, resigning in the latter year on account of domestic affliction, and since his return from England he has taken no active part in public affairs, except to serve as President of the Park Commission of Philadelphia. Mr. Welsh was connected with most of the important financial movements of Philadelphia and had served as a director in several of the railroad companies in that city. He was at one time President of the North Pennsylvania Railroad Co. and had considerable investments in that road and other railroad lines. For some years past his railroad investments have been in charge of his son, Mr. John Lawber Welsh.

TRAFFIC AND EARNINGS.

Coal.

Anthracite coal production for the week ending April 3 was 618,877 tons, against 477,795 last year; an increase of 141,082 tons, or 29.5 per cent.

Bituminous coal tonnages for the three months to April 3 are reported as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Cumberland, all lines..	374,310	472,446	D. 98,136	20.8
Hun. & Broad Top	79,428	42,233	I. 37,195	88.6
Bar. R.R. & Coal Co...	51,869	68,243	D. 16,374	24.1
B. Cr., Clear. & S. W..	234,822	166,269	I. 68,553	41.3
Pennsylvania R. R.:				
Clearfield..	553,809	806,206	D. 252,397	31.3
Mountain District ...	171,013	130,142	I. 41,771	32.1
Penn and Westmore	305,087	244,465	I. 60,622	24.4
Minor districts.	283,865	276,743	I. 7,122	2.6
Norfolk & Western....	186,234	129,183	I. 57,051	44.2
Total bituminous ..	2,241,337	2,335,930	D. 94,593	4.1

The Broad Top, Clearfield, Cumberland and Westmoreland districts are affected by the miners' strike now in progress.

Coke tonnages for the three months to April 3 are reported as follows:

	1886	1885.	Inc. or Dec.	P.c.
Southwest Penna R R....	452,019	483,413	D. 31,394	6 5
Other districts, Pa. R.R...	203,038	146,274	I. 56,764	38.9
Connellsville, *via* Pa. R.R.	16,615	23,270	D. 6,655	28 9
Total coke.....	..671,672	652,957	I. 18,715	2.9

The decrease shown in the Connellsville Region (Southwest Pennsylvania Railroad) is due to the strike, which reduced production for several weeks. The unsupplied demand stimulated production in other districts to which the strike did not extend. The coke production is now large, with an increasing demand.

Actual tonnage passing over the Pennsylvania & New York road for the four months of its fiscal year, from Dec. 1 to April 3, was:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite..... 537,427		336,458	I. 200,969	59.8
Bituminous...	60,827	89,607	D. 28,780	32.0
Total 598,254		426,065	I. 172,189	40.4

The larger part of the anthracite comes from the Lehigh Valley road, of which this line is an extension.

The coal tonnage of the Pennsylvania Railroad Division of the Pennsylvania Railroad for the three months to April 3 was:

	1886.	1885.	Inc. or Dec.	P. c
Coal 2,950,855		2,619,567	331,288	12.6
Coke...	671,672	625,900	45,772	7.3
Total 3,622,527		3,245,467	377,060	11.6

This includes all tonnage passing over the road, whether mined on the line or received from other roads.

Coal receipts at Chicago for March and the three months to March 31 were:

	March.		Three months.	
	1886.	1885.	1886.	1885.
Anthracite.....	49,386	47,786	174,837	158,496
Eastern bituminous..	51,737	65,373	193,609	205,244
Illinois	99,902	148,794	301,482	409,939
Indiana.	50,971	65,392	164,199	157,180
Coke	43,403	45,114	107,377	124,562
Total.. 295,399		372,459	941,504	1,055,421

Decrease for March, 77,060 tons, or 20.7 per cent.; for the three months, 113,917 tons, or 10.8 per cent. The decrease was chiefly in Illinois coal.

The coal tonnage of the Pennsylvania Railroad for the week ending April 10 was:

	Coal.	Coke.	Total.	1885.
Line of road..... ..	81,309	61,892	143,201	168,432
From other lines	85,261	50	85,311	87,398
Total...	166.570	61,942	228,512	255,830
Year to April 10.....3,117,425		733,614	3,851,039	3,501,297

Decrease for the week, 27,318 tons, or 10.7 per cent.; increase for the year, 349,742 tons, or 9.9 per cent.

Cotton.

Cotton movement for the week ending April 9 is reported as follows, in bales:

	1886.	1885.	Inc. or Dec.	P. c.
Interior markets:				
Receipts....	26,031	12,021	I. 14,040	117.0
Shipments	41,980	28,113	I. 13,867	49.5
Stock, April 9... ..	319,744	128,906	I. 190,838	149.5
Seaports:				
Receipts..	41,392	21,808	I. 19,584	89.8
Exports	87,463	58,178	I. 29,285	50.1
Stock, April 1... ...	800,529	625,539	I. 174,990	28.0

The total movement from plantations for the crop year to April 9 is estimated at 6,131,528 bales, against 5,485,968 last year, 5,473,014 in 1883-84 and 6,521,438 in 1882-83.

The Anthracite Agreement.

The agreement reached by the anthracite coal companies provides that the Pennsylvania Railroad Co. shall have 3,500,000 tons as its proportion for the year. The remainder shall be divided among the other companies in the following proportion: Philadelphia & Reading, 42 per cent.; Lehigh Valley, 21.18; Delaware, Lackawanna & Western, 17.35; Delaware & Hudson Canal Co., 11.90; Pennsylvania Coal Co., 5.40; Erie, 2.17; total, 100 per cent.

On the basis of 33,500,000 tons, which is assumed to be the probable output for 1886, the division would be as follows, comparison being made with the percentages allotted for 1885 and the actual division for that year:

	1886.	1885	
	Allotted.	Allotted.	Actual.
Philadelphia & Reading	37.61	38.85	36,94
Lehigh Valley.....	18 96	19 60	19.31
Delaware, Lackawanna & Western..	15.54	16.05	15 77
Delaware & Hudson Canal Co.....	10.66	11.00	10.44
Pennsylvania Railroad Co.....	10.45	8 00	10.73
Pennsylvania Coal Co.	4.84	5.00	4.75
New York, Lake Erie & Western....	1 94	1.50	2.06
Total....	100.00	100.00	100.00

The Pennsylvania Railroad Co. last year refused to enter the combination, claiming that it could not bind its shippers to any limit, but must carry all coal offered. This year it maintains its position, naming a certain amount as its probable output, and being still outside the combination and not bound to make any reduction, should the other companies decide to reduce production below 33,500,000 tons, which is not at all unlikely.

New England Traffic Notes.

The Boston Clearing House reports loaded cars coming into New England at all points during the month of March, 1886, as compared with March, 1885, as follows: March, 1886, 43,182; March, 1885, 40,553; increase, 2,629, or 6.5 per cent.

Transcontinental Passenger Rates.

There has been some improvement in transcontinental passenger rates, and the rate from Missouri River points to San Francisco has been increased from $5 to $12, with a corresponding increase in second class and in round-trip rates. A corresponding increase has been made from Chicago and other points.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Three months to March 31:				
Boston, Hoosac Tun. & W....	$128,297	$90,202	I. $32,095	33.5
Bur., C. R. & No.	627,054	698,625	D. 71,571	10.2
Char., Col. & A..	232,439	237,165	D. 4,726	2.0
Cleve., Ak. & Col.	109 655	105,294	I. 4 361	4.2
Cin., N. O. & T. P.	642,036	606,685	I. 35,351	5.8
Cin., W. & Balt..	477,324	467,260	I. 9,964	2.1
Col. & Greenville	212,291	211,716	I. 575	0.3
Col., Hocking Vy. & Tol.....	525.921	539,587	D. 13,666	2.5
Den. & R. G. W.	211,136	198,991	I. 12,145	6.1
Ev & T. Haute...	165,448	158,452	I. 6 996	4.4
Flint & Pere M..	508,544	431,530	I. 77,014	13.2
Grand Trunk....	3,380,722	3,200,669	I. 180,053	5.6
Gulf, Col. & S. F.	434,063	271,639	I. 162,424	59.7
Illinois Central.:				
Ill. lines	1,424,156	1,519,844	D. 95,688	6 3
South. Div.....	1,001,845	1,239,629	D. 237,784	19.2
Iowa lines.....	360,152	359,827	I. 325	0.1
K. C., Clinton & Spr.....	49,657	.....	.....	....
K. C., Ft. S. & G.	542,693	615,180	D. 72,487	11.8
K. C., Spr. & M...	317,180	457,595	D. 140,415	30.7
Lou., Ev. & St. L.	187,047	154,301	I. 32,746	21.3
Louisv. & Nash..	3,200,192	3,535,573	D. 335,381	9.5
Mobile & Ohio..	458,346	557,131	D. 98,785	17.7
N. Y., Ont. & W.	259,316	349,561	D. 90,245	25 8
Ohio Southern....	127,715	104,246	I. 23,469	22.5
Peoria, Dec. & E.	173,444	176,598	D. 2,154	1.2
Rich. & Dan.....	1,017,640	996,105	I. 21,535	2.2
St. Jo. & Gd. I..	277,663	289,060	D. 11,397	3.9
St. L., A. & T. H.:				
Main Line.....	268,604	311,008	D. 42,404	13.6
Bellev.lle Line.	178,008	199,358	D. 21,350	10.7
St. P., M. & Man.	1,424,176	1,433,353	D. 9,177	0.6
Va. Midland.....	305,613	317,607	D. 11,994	3.8
Western N. C....	122,103	105,467	I. 16,636	15.8
Two months to Feb. 28:				
Ches. & Ohio....	$534,410	$511,004	I. $23,406	4 6
Net earnings...	141,903	114,394	I. 27,509	24.2
Ches., O. & S. W.	230,896	227,704	I. 3,192	1.4
Net earnings...	64,054	54,964	I. 9,090	16.5
C., I., St. L. & C.	395,162	375 087	I. 19,175	5.1
Net earnings...	147,294	120,523	I. 26,771	22.3
Dayton & Iron..	41,628	.....	.....	....
Net earnings...	3,726	.....	.....	....
Denver & R. G....	832,650	800,649	I. 32,001	3.9
Net earnings...	218,590	171,131	I. 47,459	26.6
Eliz., Lex. & B. S..	122,909	104.323	I. 18,586	17 8
Net earnings...	30,411	29,900	I. 511	1.7
Gal., H. & S. An.	403,165	448,159	D. 44,994	10.0
Net earnings...	91,041	173,206	D. 82,165	47.4
Gulf, W. T. & P..	10,402	.....	.....	....
Net earnings...	1,083	.....	.....	....
L. Rock & Ft. S..	91,832	97,951	D. 6,319	6.4
L. Rock Junction.	7,687	7,232	I. 455	6.3
Louisiana West..	96 401	91,720	I. 4,681	5.1
Net earnings...	48,328	44.291	I. 4,037	9 2
L., N. O. & Tex..	298,957	197.913	I. 101,044	51.0
Net earnings...	70,918	32,877	I. 38,041	115.7
Morgan's La. & T.	717,703	632,958	I. 84,745	13.4
Net earnings....	206,632	239,967	D. 33,335	13 9
N. Y., Texas & Mex	21,789	.... ..	..... .	....
Net earnings...	1,934	....	..... .	....
St. Jo. & Gd. I..	166,375	170,998	D. 4,623	2.6
Net earnings...	71,305	52,900	I. 18,405	34.7
Scioto Valley	95,140	.....	.....	....
Tex. & N. Ori'ns.	152,084	145,029	I. 7,055	4.8
Net earnings...	67,136	54,385	I 12 751	23.8
Month of January:				
Cl., C., C. & I..	$285,733	$287,001	D. $1,268	0.5
Net earnings..	66,370	63,809	I. 2,561	3.9
So. Pacific Co.:				
Atlantic system	734,978	602,363	I. 72 615	10.9
Net earnings..	218,503	240.347	D. 21,844	9.1
Pacific system..	1,273,442	1,683,102	D. 409,660	24.3
Net earnings.	488,664	873,432	D. 384,768	44.1
Month of February:				
Ches. & Ohio.....	$273,241	$218,094	I. $55,147	25.3
Net earnings ..	80,287	36,417	I. 43,870	120.5
Ches., O. & S. W.	113,630	112,186	I. 1,444	1.3
Net earnings...	33,873	29,059	I. 4,814	16.6
C., I., St. L. & C.	199,168	172,544	I. 26,624	15.4
Net earnings....	68,901	51,176	I. 17,725	32.8
Dayton & Ironton	20,376	.....	.....	..
Net earnings...	1,518	.....	.....	....
Denver & R G ...	427,747	395.308	I. 32,439	8.2
Net earnings..	130,049	97,675	I. 32,374	33.0
Eliz., Lex. & B. S.	63,631	48,682	I. 14 949	30.5
Net earnings...	16,103	15,395	I. 708	4.7
Gal., H. & S. An..	203,819	237,063	D. 33,244	14.0
Net earnings...	61,534	85,802	D. 24,328	28.3
Gulf., W. T. & P.	3,754	.....	.....	...
Net earnings...	473	.....	.....	....
Hous. & Tex. C..	185,839	144,937	I. 40,902	28.2
Net earnings....	*8,584	*22,542	D. *13,958	60.7
L. Rock & Ft. S.	47,711	44,985	I. 2,726	6.1
L. Rock Junction	3,803	1,796	I. 2,007	111.5
Louisiana West..	45,081	51,892	D. 6,811	13.1
Net earnings...	23,102	25,284	D. 2,182	8.3
L., N. O. & Tex..	139,210	98,617	I. 40,593	41.0
Net earnings...	34,643	23,573	I. 11,070	46.1
Morgan's La. & T.	334,475	286,595	I. 47,880	16.6
Net earnings...	81,441	120,531	D. 39,090	32.5
N. Y., Texas & Mex....	10,059	.. ..	.....	....
Net earnings...	906	.....	.....	....
St. Jo. & Gd. I ..	113,016	82,200	I. 29,816	36.0
Net earnings...	64,109	26,937	I. 37,202	137.8
Scioto Valley.....	51,405	.....	.....	....
Tex. & N. Ori'ns.	69,382	79,955	D. 10,573	13.2
Net earnings..	28,741	30,677	D. 1,936	6.2
Month of March:				
Boston, Hoosac Tun & W.....	$47,623	$41,137	I. $6,486	15.8
Bur., C. R. & No.	241,943	272,369	D. 30,426	11.2
Char., Col. & A..	84.019	75,578	I. 8,441	11.1
Cin., N. O. & T. P.	234,021	208 957	I. 25 064	12.0
Cin., W. & Balt..	188,079	152,074	I. 26,005	17.0
Cleve., Ak. & C..	42,731	40.108	I. 2,623	6.5
Col. & Greenville.	78,560	69,062	I. 9,498	13.8
Col., Hocking Vy. & Tol.....	198,596	214,330	D. 15,734	7 4
Den. & R. G. W..	83,472	69,335	I. 14.137	20.5
Ev. & T. Haute..	58,429	60,818	D. 2,389	3.9
Flint & Pere M..	199,503	158,108	I. 41,395	26.8
Grand Trunk.	1,226,362	1,087,700	I. 138,662	12 7
Gulf, Col. & S. F..	140,335	93,634	I. 46,701	49.8
Ill Central:				
Ill. lines	490.961	555,369	D. 64,408	11.6
South. Div.....	313,039	419.431	D. 106,392	25.8
Iowa lines.	153,700	154,082	D. 382	0.2
K. C., Clinton & Springfield	18,010	... .	.....	....
K. C., Ft S. & G.	207,211	214 910	D. 7,699	3 6
K. C., Spr. & M...	130,845	134,683	D. 3,838	2.9
Lou., Ev. & St. L.	72,832	51,000	I. 21,832	42.8
Louisv. & Nashv.	1,100,905	1,281,516	D. 180 611	14.1
Mobile & Ohio...	143,971	190,956	D. 46.985	24.7
N. Y., Ont. & W.	97,381	148,503	D. 51,122	34.2
Ohio Southern....	38.946	15,596	I. 23,350	149.8
Peoria, Dec. & E.	56,678	59,791	D. 3,113	5.2
Rich. & Dan.....	392,600	360,562	I. 32,038	8.9
St. Jo. & Gd. I...	111,288	118,062	D. 6,774	5.7
St. L., A. & T. H.:				
Main Line.....	89,655	113,951	D. 24,296	21.3
Belleville Line.	57,979	68.058	D. 10.079	14.8
St. P., M. & Man..	590.000	576,011	I. 13,989	2.4
Va. Midland	113,981	113,698	I. 283	0.2
Western N. C.....	45,606	38,586	I. 7,020	18.1

* Deficit.

Transcontinental Freight Rates.

There has been no change of importance in the condition of transcontinental freight rates during the week, although it is reported that negotiations are still in progress for the settlement of existing difficulties; and that a substantial agreement has been reached in relation to the basis of agreement. Nothing definite has, however, been made public.

Northwestern Freight Rates.

The cutting of rates between Chicago and Northwestern points has continued, and the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul lines have reduced rates to 8 and 10 cents per hundred pounds between Chicago and St. Paul. Rates to Omaha and Nebraska points are fairly well maintained, the chief cutting being to St. Paul and Minnesota points.

A meeting was held at Chicago at the close of the week, at which most of the lines formerly in the Northwestern Traffic Association were represented, but no definite result was reached, as some of the companies would not agree to maintain rates, while others declined to attend the meeting at all.

St. Louis Live Stock Shipments.

The February statement of live stock forwarded East from the National and Union stock yards and East St. Louis stations, as submitted to the members of the St. Louis eastbound freight committee by Joint Agent Dr. Pew, gives the following totals:

	Cars.	Head.
Chicago & Alton	269	11,537
Wabash	95	3,544
Indianapolis & St. Louis	303	22.163
Vandalia	249	28.056
Ohio & Mis-issippi	49	2,123
Total	965	67,423

The total movement in February, 1885, was 1,332 cars, 93,639 head; for February, 1884, 1,687 cars, 91,563 head.

Western Railway Weighing Association.

The Western Railway Weighing Association during the month of March, 1886, weighed 54,245 carloads of freight, against 47,871 cars in February, 1886, an increase of 6,374 cars. During the month of March, 1885, 56,442 cars were weighed.

RAILROAD LAW.

New York Railroad Legislation.

The lower house of the New York Legislature has passed three of the bills proposed by the Railroad Commission. The first bill makes railroad companies responsible for damages to property caused by fire, communicated directly or indirectly by their engines, but gives them an insurable interest in adjoining property and authorizes them to procure insurance thereon, in their own behalf.

The second bill prohibits the transportation of explosives of any description on passenger trains, and directs that when the nitro-glycerine and the other high explosives are shipped as freight they must be especially marked to acquaint all persons who may handle them with their dangerous nature.

The third bill requires the Railroad Commissioners to "certify that public convenience and necessity require the construction" of any future railroads before their building can begin. A company, after publishing its articles of association once a week for three weeks in a newspaper in each county through which its route extends, must, within six months after this publication, make application to the Railroad Commissioners for the necessary certificate. If a certificate is is refused, the directors may make their application to "a General Term of the Supreme Court of the department within which said road is proposed in whole or in part to be constructed, and said General Term shall have power, in its discretion, to order said Board of Railroad Commissioners, for reasons stated, to issue said certificate, and it shall be issued accordingly."

The fourth of the commission bills, which prohibits the carrying of highways across railroads at grade hereafter, requiring the construction of either overhead or sub-crossings, was rejected by the House.

Right of a Company to Guarantee Bonds of Another.

In the case of Fletcher against the Atchison, Topeka & Santa Fe Co., a suit brought to restrain the company from paying interest on the bonds of the Sonora Railway Co., under a guarantee of those bonds, the Kansas Supreme Court has refused to grant the injunction, holding as follows:

1. A corporation is clothed everywhere with the powers given by its charter, and has the capacity to carry on its business in other states and counties so long as it does not depart from the terms of the charter under which it was created.

2. Additional power, auxiliary to the original design or purpose of the corporation, may be conferred thereon by the legislature of the state where the corporation is created.

3. Under the provisions of the charter of the Atchison, Topeka & Santa Fe Railroad Co. of Feb. 11, 1859, the terms of the statutes of Kansas, if such company guarantees a bond or other negotiable instrument, and takes the same as its own and sells it, its guarantee will be binding upon the company in the hands of an innocent holder for value and without notice of the origin of its title, even if the guarantee of that particular bond, or other negotiable instrument, when made, was ultra vires in that special instance.

4. Any railroad company organized under the laws of this state may lease the road or appurtenances of any other railroad company, when the road so leased shall become, in the operation thereof, a continuation and extension of the road of the company accepting the lease.

5. Under its charter and the statutes of the state the Atchison, Topeka & Santa Fe Railroad Co. cannot only lease a Colorado railroad, but can also lease roads in New Mexico, Arizona and Old Mexico, if each road so leased thereby becomes in the operation thereof a continuation and extension of the road of the Atchison company.

6. Upon the facts disclosed in this case, the Atchison, Topeka & Santa Fe Railroad Co., under its charter and the statutes of the state, had authority to accept the stock of the Sonora Railway Co., of Mexico, and guarantee its mortgage bonds.

7. The statute expressly provides if a court or judge deem it proper that the defendant or any party to the suit shall be heard before granting a temporary injunction prayed for; that reasonable notice may be given to the party, and, in the meantime, a restraining order may be issued thereof. A court or a judge should not grant a temporary injunction in an action involving large pecuniary interests or other important matters without notice where the party to be affected thereby can be readily notified, except in case of extreme emergency. The hasty and improvident granting of temporary injunctions without notice is not in accordance with a fair and orderly administration of justice.

OLD AND NEW ROADS.

Addison & Northern Pennsylvania.—The New York Supreme Court has appointed a receiver for this company on application of the creditors. Mr. Thomas C. Platt, President of the company, is the Receiver. The road is a narrow-gauge line extending from Addison, N. Y., to Gaines, Pa., 41 miles, with a branch 5 miles in length. It was built principally as a coal road. The company has $600,000 capital stock and $600,000 in first-mortgage bonds, and its earnings have not been sufficient to pay the interest.

Arkansas & Northwestern.—This company has been organized to build a railroad from Clarksville, Ark., northward through Fayetteville to the Missouri line in Benton County, a distance of 130 miles.

Atchison, Topeka & Santa Fe.—The Kansas Supreme Court, in the suit brought some time ago by Mr. Fletcher, of Detroit, to restrain this company from paying interest on the bonds of the Sonora Railway Co., which it guarantees, has decided against granting the injunction. The Court held that if the company had guaranteed a bond and sold it, its guarantee would be binding upon the company in the hands of an innocent holder, even if the guarantee of that particular bond was beyond the powers of the company. Under the Kansas law, however, any railroad company may lease the road of any other railroad company when such road is a continuation and extension of the lessee's line. The Court holds that upon the facts in this case, the Atchison Co., under its agreement, had guaranteed the bonds of the Sonora Co. and the guarantee is therefore good and binding and no injunction will be issued.

The company's statement for February and the two months to Feb. 28 is as follows:

	February.		Two months.	
	1886.	1885.	1886.	1885.
Miles worked	2,418	2,375	2,411	2,375
Earnings	$1,057,407	$1,064,747	$1,919,610	$2,180,445
Expenses	606,293	653.221	1,172,225	1,324,013
Net earnings	$451,114	$411,526	$747.385	$856,432

For the two months the gross earnings decreased $260,835, or 11.9 per cent., and the expenses $151,788, or 11.5 per cent., leaving a decrease in net earnings of $109,047, or 12.7 per cent.

It is reported that the company will make a new issue of stock in exchange for the stock of the Gulf, Colorado & Santa Fe Co., as noted elsewhere.

This company has announced the following extensions in Kansas: Larned Branch, now under construction. Great Bend Extension, now under construction to Rush County; this is eventually to be a main line. Hutchinson Extension, Hutchinson to Kingsley; this line will be completed to St. John, in Stafford County, this year, and if the aid now pending in Edwards County is voted, it will be completed to Kingsley next year. Mulvane Extension, being from Mulvane due west; the contract for 40 miles of this road has been let, and will be built immediately. This line will soon be extended west. Douglas Branch, extended to Winfield; work is to be finished on this extension before fall. Emporia & Eldorado Short Line, a road 30 miles in length. Independence Extension, Independence to Cedarville, by Peru and Elgin, 57 miles; this line to be completed before winter. Burlington Extension, 15 miles. Colony Extension, 25 miles. Ottawa Extension, Ottawa to Osage City, 22 miles; this line will be completed immediately.

Atlanta & Atlantic.—There is quite an agitation at present in Atlanta, Ga., for the construction of a new line from that city to the seaboard, and several public meetings have been held to advocate the project. The promoters, however, are not agreed among themselves, some of them desiring to build a line from Atlanta to Hawkinsville on the East Tennessee, Virginia & Georgia line, from whence connection can be made with the Port of Brunswick. This line, it is claimed, will open up a good country from which much local business can be expected, and will also connect at Hawkinsville not only with the East Tennessee road, but with the steamboats on the Ocmulgee River, which is navigable to that point for boats of considerable size. Others advocate a line from Atlanta to a point on the Savannah River below the Hirshman shoals, which limit the navigation of that river to large boats. This party claims that all the advantages of the seaboard connection can be secured by such a line, and that it will reach a still better country than the Hawkinsville route. There is considerable discussion on this question of route, but the interest awakened is very active, and it appears probable that it will result in building one of the two lines.

Augusta & Chattanooga.—This project is for the construction of a new line from Augusta, Ga., to Chattanooga, and has found many advocates along the line. A considerable amount has already been subscribed to the stock at Augusta and other points, and the projectors hope shortly to be able to begin active work. The line will be to some extent parallel to that of the Georgia Railroad, but will be for the most part considerably northward of that line, although, if built, it will interfere with its through traffic. It is understood that the project has the support of the South Carolina Railway Co. It may be said to be the revival of a very old project, being really the eastern extension of the Memphis & Charleston road as proposed some 30 years ago.

Boston & Albany.—This company has raised the wages of its trackmen from $1.30 to $1.50 per day, beginning with April 10.

California Southern.—The transfer of this road to the Atchison, Topeka & Santa Fe has been completed, all the formalities required by law having been completed. The Atchison Co., it will be remembered, acquires control of the road, guaranteeing the bonds required to put it in good condition and extend the line from Colton to a connection with the Atlantic & Pacific, and the holders of the old first-mortgage bonds accepted income bonds in exchange.

Canadian Pacific.—It is stated that this company has sold a sufficient amount of its bonds in London through Baring Bros. to repay to the Canadian government $20,000,000 of the amount advanced by the government. The Minister of Finance will shortly submit to the Canadian parliament the government's agreement with the company, which is to the effect that the company shall repay $10,000,000 on May 1 and $10,000,000 on July 1. Upon the last payment the government will take back a sufficient quantity of the land granted to the company at a valuation of $1.50 per acre to repay the balance of the company's indebtedness.

This company makes the following statement of earnings and expenses for February and the two months to Feb. 28:

	February.	Two months.
Earnings	$485,458	$985 816
Expenses	415,741	869,718
Net profits	$69,717	$116,098

"The gain in net profits over the same period last year is for February $2,571, and from Jan. 1 to Feb. 28, as compared with last year, there is a decrease of $35,754. The gross earnings for February include nothing for the carriage of construction material as against $50,372 during the same month last year."

Central Transportation Co.—The annual statement of the directors of this company urges stockholders to hold on to their stock, believing that it will be eventually valuable and that they will secure a share of the assets of the company. The report states that the whole aim of the Pullman Co. has been to wear out the holders and force them to sell at a sacrifice. The assets of the company include 119 sleeping cars, $10,000 in Pennsylvania Canal bonds, the trust fund, amounting to $677,146, and some securities of unknown value transferred by Cottringer, the secretary and treasurer, who recently defaulted.

Chesapeake & Ohio.—The statement for February and the two months to Feb. 28 is as follows:

	February.		Two months.	
	1886.	1885.	1886.	1885.
Earnings	$273,241	$218,094	$534,410	$511,004
Expenses	192,954	181,677	392,447	396,610
Net earnings	$80,287	$36,417	$141,963	$114,394

For the two months the gross earnings increased $23,406, or 4.6 per cent., and the expenses decreased $4,163, or 1.1 per cent., the result being a gain of $27,569, or 24.2 per cent., in net earnings. The increased earnings are due partly to an increased movement of through freight, and partly to a large increase in coal business.

Chicago & Atlantic.—Judge Gresham, in the United States Court at Indianapolis, April 8, delivered an opinion in the suit of the Farmers' Loan & Trust Co. against this company. The suit was brought to foreclose a mortgage on the line from Marion, O., to Chicago. The Court held that the law relied on by the company for showing that the plaintiff could not act as mortgage trustee, known as the Coffroth act of the Indiana Legislature of 1869, prohibiting a foreign resident from acting as trustee of a mortgage executed by a corporation created by the state, is invalid because of its unconstitutionality; second, he held that notwithstanding the terms of the mortgage that proceedings shall not be instituted until requested by a majority of the mortgage bondholders, the complainants had a right to bring the suit and were entitled to a decree *nisi*, ascertaining the amount due upon the coupons not held by the resisting bondholders, and if the amounts were not paid within a reasonable period fixed by the Court the decree would issue; third, that Mr. Jewett was made trustee only because he was President of the Erie road, and could be relied on to control the Chicago & Atlantic as the Erie's Western outlet; fourth, that the bolders of past due and unpaid coupons were entitled to their money, irrespective of the arrangements between the two companies, and it might become necessary for the Court to take the property and manage it for their benefit, but for the present, action on the motion for the appointment of a receiver was deferred.

Chicago, Burlington & Quincy.—Surveys are being made for a branch of this road from Galesburg, Ill., northward to Rio, about 11 miles. The object of this branch is apparently to secure a shorter connection between Galesburg and Rock Island.

Chicago & Great Southern.—The sale of this road under foreclosure to H. H. Porter and associates has been confirmed by the Court and the necessary deed ordered to be executed.

This line will hereafter be known as the Indiana Railroad, the purchasing bondholders having organized under that name.

Chicago, Nebraska & Kansas.—The city of St. Joseph, Mo., has subscribed $200,000 to the stock of this company, which the company asked for, and this action is understood to secure the construction of the road from that point. This is the line which is understood to be backed by the Rock Island Co. Under the agreement 300 miles of the road are to be built in two years.

Chicago & Northwestern.—This company has agreed to build a branch from Janesville, Wis., northwest to Evansville, about 17 miles, provided the right of way is given by the people who are interested in securing the extension.

Chicago & West Michigan.—This company, it is said, will this year extend its line from Baldwin, Mich., the present terminus of the Newaygo Division, northward to Traverse City; and will also extend its main line on the southern end from the present terminus at Lacrosse, Ind., southward about 3 miles, to a connection with the Chicago & Atlantic road. The company also proposes building a branch from the Traverse City extension to Frankfort on Lake Michigan, and is considering the question of building a branch to Cadillac, to be hereafter extended to Alpena on Lake Huron.

Cincinnati, Indianapolis, St. Louis & Chicago.—The statement for February and the eight months of the fiscal year from July 1 to Feb. 28 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings	$199.168	$172,544	I. $26.624	15.4
Expenses	130,267	121,368	I. 8,899	7.3
Net earnings	$68,901	$51.176	I. $17,725	34.8
Fixed charges	50,000	50,000		
Surplus, Feb.	$18,901	$1,176	I. $17.725	
Surplus, July 1 to Jan. 31	217.068	230,649	D. 13,581	5.9
Surplus, 8 mos.	$235,969	$231,825	I. $4.144	1.8

The surplus for the eight months this year is equivalent to 3.37 per cent. on the stock. One dividend of 1 per cent. has been paid since the beginning of the current fiscal year.

Cincinnati, Jackson & Mackinaw.—This company gives notice that in pursuance of the joint agreement and articles of consolidation between the Cincinnati, Van Wert & Michigan Co. and the Jackson & Ohio Co., and of the statutes of the states of Ohio and Michigan, in such cases made and provided, the Cincinnati, Jackson & Mackinaw Railroad Co. has succeeded to and taken possession of all the contracts, rights, franchises and property, and has assumed all the liabilities of said Cincinnati, Van Wert & Michigan Railroad Co. and the Jackson & Ohio Railroad Co. The consolidation has been already noted.

Cleveland, Columbus, Cincinnati & Indianapolis.—This company's statement for January is as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Earnings	$285.733	$287,001	D. $1,368	0.5
Expenses	219.363	223,192	D. 3,829	1 7
Net earnings	$66.370	$63,809	I. $2.461	3.9
Interest, taxes, etc.	67,330	64,974	I. 2,356	3.6
Deficit	$960	$1,165	D. $105	9.0

Expenditures for additions to property in January this year were $13,997, making a total deficit of $14,957 for the month.

Denver & Rio Grande.—The Receiver's statement for February and the two months to Feb. 28 is as follows:

	February.		Two months.	
	1886.	1885.	1886.	1885.
Earnings	$427.747	$395,308	$832.630	$800.649
Expenses	297,698	297,633	614,060	629,518
Net expenses	$130,049	$97,675	$218,590	$171,131

For the two months the gross earnings increased $32,001,

or 3.9 per cent., and the expenses decreased $15,458, or 2.5 per cent., the result being a gain of $45,459, or 26.6 per cent., in net earnings.

Dayton & Ironton.—The statement for the two months to Feb. 28 is as follows:

	January.	February.	Two mos.
Earnings	$21,252	$20,376	$4 .628
Expenses	19,044	18,858	37,902
Net earnings	$2,208	$1,518	$3,726
Fixed charges	1,686	2,967	4,653
Surplus or deficit	S. $522	D. $1,449	D. $927

The earnings for the two months were $245 gross and $22 net per mile.

Denver & Rio Grande Western.—President Wm. J. Palmer issues the following circular, dated New York, April 7:

"The agreement heretofore entered into for a full settlement of all controversies between this company and the Denver & Rio Grande Railway Co., has now become operative and binding by the performance of the conditions upon which it was based. This agreement provides that each railway property shall be in the speediest way rehabilitated and put into possession of its owner, the parties represented agreeing to co-operate to this end. That the lease and all obligations between the two companies growing out of it are to be cancelled, and the two properties, so long as conditions remain as they now are as affecting their business, shall be operated harmoniously under arrangements substantially the same as now exist between the two receivers. 'Neither company shall directly or indirectly encourage or promote the building of any line in the territory of the other, nor divert or consent to the diversion of business to any competing line to the injury of the other company; and each company is to co-operate to increase the business of the sytem.'

"As the lease was made prior to the completion of the present lines of the Western Co., the rolling stock to operate them was provided, under car trust contracts, by the Denver Co. in accordance with the terms of the lease. Under the present agreement it is contemplated that the Denver Western funding plan of Aug. 27 shall be consummated, and all bondholders who avail themselves of that plan and release their guaranty will be given additional security for their bonds and interest by means of a first lien created for their benefit on the rolling stock, clear title to which (discharged from the car trust and all other liens) will be vested in trustees for that purpose. When all bondholders assent, the clear unencumbered title will be vested in the mortgage trustees for the benefit of all alike. Thus you will receive an equivalent for the guarantee of your bonds in a first lien on the rolling stock adequate to operate the line with its present traffic. Since the net earnings will no longer be required to purchase such rolling stock or to pay rental thereon, or interest on the cost (which interest amounted during the past year of the receivership to about $50,000, or at the rate of nearly ¾ of 1 per cent. per annum on the entire railway bonds), the amount thus saved will constitute, *first*, an additional guarantee for the punctual payment of the sums promised under the funding plan; and *second*, inasmuch as these are considered already sufficiently certain, they will anticipate the principal of the funding certificates and further assure the resumption of full interest on the bonds. * * *

"The arrangement, as a whole, without doubt adds materially to the value of your bonds, as well in expediting the resumption of interest at the full rate (through the removal of a prior charge) as in increasing the security for the principal; and the property is benefited by a full and final settlement of the numerous controversies and law suits which have been waged between the two concerns."

Detroit, Bay City & Alpena.—This company's road has been changed from 3 ft. to standard gauge, the lower end of the road having been changed on April 8 and the upper half on April 10. The road extends from Alger, Mich., on the Michigan Central, to Black River, 83 miles. It was originally built of 3 ft. gauge, but with the expectation of a change to standard gauge, all the bridges, cuts and other work were made sufficient width.

Arrangements are being made to begin work shortly on the extension of the road from Black River, northward along the shore of Lake Huron to Alpena.

East St. Louis Strike.—The strike of the yardmen in the East St. Louis yards culminated in a serious riot on April 9, when a party of the deputy sheriffs employed in guarding a train on the Louisville & Nashville road at the bridge over Cahokia Creek, fired on the strikers and others who were gathered on the road bridge close by. The mob had been jeering at and insulting the guards, and had, it is claimed, assaulted them with stones, but the actual assault is disputed. The effect of the firing was to kill four persons and dangerously injure three others, one of them a woman. After the firing the guards did not attempt to stand their ground, but fled across the bridge to St. Louis, and East St. Louis remained in the hands of the mob. That night several freight cars were burned in the Louisville & Nashville yard, and in the Cairo Short Line yard a freight train and an oil shed were also burned.

On receiving the news of the riot, the Governor of Illinois ordered out the militia, and 10 companies were sent to East St. Louis. On their arrival, order was restored and work resumed in the yards. The military force still remains in possession, and the different roads are making up and dispatching trains, some of the local employés having returned to work, while a number of men have been brought from other points. The transfer of trains across the bridge to St. Louis also proceeds without interruption, the bridge employés having generally returned to work. Whether matters will proceed quietly when the military force is withdrawn, remains to be seen.

As a consequence of the railroad strike, a number of the coal miners in the St. Louis district have struck. In some of the mines the men remain at work, but the output of coal is for the time reduced much below the usual production, and a short supply is feared, none of the coal operators carrying much stock.

East Tennessee, Virginia & Georgia.—The statement for February and the eight months of the fiscal year from July 1 to Feb. 28 is as follows:

	February.		Eight months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$341,386	$311,894	$2,892,877	$2,869,122
Expenses	221,112	200,016	1,688,146	1,801,921
Net earnings	$120,274	$111,878	$1,204,731	$1,067,201

For the eight months the gross earnings increased $23,755, or 0.8 per cent., and the expenses decreased $113,775, or 6.3 per cent., the result being a gain of $137,530, or 12.9 per cent., in net earnings.

Notice is given by the bondholders' committee that income bondholders must deposit their bonds and assent to the agreement not later than April 27; holders thus depositing will secure the right to subscribe *pro rata* for that part of the new securities allotted under the plan to the income bondholders and not taken. The committee urges bondholders that this plan offers them more advantages than could probably be secured under any other.

The opposition committee of stockholders and income bondholders is making an active canvass and claims to have secured at least $6,000,000 of the income bonds to its plan. This committee announces its intention to push actively its plan and the suit recently instituted against the company.

Georgia Midland.—The contract for building this projected line from Columbus, Ga., to Griffin, has been let to P. P. Dickinson, of New York.

Grand Trunk.—This company's statement for February and the two months to Feb. 28 is as follows:

	February.		Two months	
	1886.	1885.	1886.	1885.
Earnings	£231,128	£202,674	£457.700	£4 6,252
Expenses	179,010	180,354	364 992	386,537
Net earnings	£52,118	£22,320	£92,708	£69,715

For the two months the gross earnings increased £1,448, or 0.3 per cent., and the expenses decreased £21,545, or 5.5 per cent., the result being a gain in net earnings of £22,993, or 33 per cent.

The statements for the controlled lines west of Detroit are as follows for the two months:

	C. & G. T.		D., G. H. & M.	
	1886.	1885.	1886.	1885.
Earnings	£83,417	£86.355	£'74.585	£30.879
Expenses	77.211	78,881	27.109	27,139
Net earnings	£6,206	£7,474	£7,476	£3,740

The Chicago & Grand Trunk shows a decrease of £2,938, or 3.4 per cent., in gross earnings, and of £1,268, or 16.9 per cent., in net earnings. The Detroit, Grand Haven & Milwaukee gained £3,706, or 12.0 per cent., in gross earnings, and £3,736, or 99.4 per cent., in net earnings.

Gulf, Colorado & Santa Fe.—This company has made a proposition to the city of Fort Worth, Tex, to the effect that it will start the line which it is to build northward through the Indian Territory from that point, provided the city will give $30,000 cash bonus, and right of way through the county. The proposition has been accepted and the money has nearly all been raised.

It is reported that the negotiations between this company and the Atchison, Topeka & Santa Fe will probably result in a complete transfer of the road, holders of this company's stock to surrender their shares and receive Atchison stock in exchange. The basis of exchange is not settled as yet. Nothing definite has been officially announced as yet.

Illinois Central.—This company makes the following statement of gross earnings for the quarter ending March 31:

	1886.	1885.	Average, 1878-84.
Illinois Division	$1,424,156	$1,519,844	$1,424,501
Southern "	1,001,845	1,239,629	1,002,839
Total, line owned	$2,426,001	$2,759,473	$2,427,340
Dubuque & Sioux City	197,414	194,045	233,657
Iowa Falls & Sioux City	130,037	140,188	136,452
Cedar Fall & Minnesota	32,701	25 594	28,927
Total Iowa leased lines	$360,152	$360,827	$399,036
Total, all lines	$2,786.153	$3,120,300	$2,826,376

The lines owned show a decrease of 12.6 per cent. from last year, but earned almost exactly the average of the six years preceding. The Iowa lines gained a very little over last year, but fell 9.8 per cent. below the six years' average.

Indiana.—The purchasers of the Chicago & Great Southern road at foreclosure sale have organized the Indiana Railroad Co., with a capital stock of $5,000,000. The road owned by the new company extends from Fair Oaks, Ind., on the Louisville, New Albany & Chicago, south to Brazil, 124 miles.

Jacksonville, Tampa & Key West.—This company will soon begin work on an extension of its main line from Sanford, Fla., to Tavares, 29 miles. An extension of the Indian River Division is also proposed, to run from Titusville to Rock Ledge on the Atlantic Coast, about 22 miles.

The company has obtained possession of the De Land & St. Johns road, a short branch running from De Land to De Land Junction, and a landing on the St. Johns River; it is 5 miles long.

Kanawha & Ohio.—Arrangements are being made to consolidate this company, which was organized by the purchasers of the River Division of the Ohio Central in West Virginia with the Ohio & Kanawha, which was organized by the purchasers of the same line in Ohio. The consolidated company will own the line now completed and in operation from Corning, O., to Point Pleasant, and thence to Charleston, W. Va., including the bridge over the Ohio River. It is understood that as soon as the consolidation is completed work will be begun on the connection with the Chesapeake & Ohio at Charleston, and also with the extension from Charleston eastward to the mouth of the Gauley River.

Kentucky & Indiana Bridge.—At 4 o'clock Saturday afternoon, April 10, the last screw necessary to complete the 485 ft. cantilever span of the Kentucky & Indiana Bridge over the Ohio River at New Albany was tightened to its position by Colonel Bennett H. Young, President of the bridge company, a large number of the prominent citizens of New Albany and Louisville being in attendance at the ceremonies. The span is over the Kentucky channel, between Sand Island and the Kentucky shore, and was thrown out without false work or under-supports. The next longest span is on the Indiana side of Sand Island, and is 483 ft. long. This bridge is the longest system of cantilever spans in the United States, and two of its spans the longest cantilevers in the world. Only the draw span of the bridge remains to be erected. It is over the Indiana steamboat channel, the draw being 260 ft. on either side of the pivot pier. These spans are also cantilevers, and stand 38 ft. above the high-water mark of 1884, and 40 ft. 6 in. above that of 1832. The draw spans will be completed by June 15, and the opening of the bridge will be celebrated probably on July 4. Architecturally, this is the handsomest bridge over the Ohio, or in the West or South.

Lehigh & Hudson River.—This company reports a large and increasing business, chiefly owing to the increased transportation of coal, resulting from the contract with the Lehigh Coal & Navigation Co. For the six months for the fiscal year from Oct. 1 to April 30 the gross earnings were $102,178, as against $83,951 for the corresponding half of the previous year, the increase being $18,227, or 22 per cent. The company is now having several Mogul freight engines built for the purpose of handling the coal traffic.

Louisville & Nashville.—The statement for February and the eight months of the fiscal year from July 1 to Feb. 28 is as follows:

	February.		Eight months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$1,049,268	$1,083,308	$8,935,765	$9,360,277
Expenses	665,452	678,450	5,490.578	5,380,283
Net earnings.	$383,814	$404,858	$3,445,187	$3,979,994

For the eight months the gross earnings decreased $424,512, or 4.5 per cent., and the expenses increased $110,295, or 2.1 per cent., the result being a decrease of $534,807, or 13.4 per cent., in net earnings.

Louisville, New Orleans & Texas.—The contractor, Mr. J. P. McDonald, has completed the tunnel through the bluff a mile south of Vicksburg, Miss., which was begun in January of last year. The tunnel is 717 ft. long, but the contractor has met with many obstacles, owing to the nature of the ground, which delayed its completion. The tunnel is 18 ft. high in the clear and 14 ft. wide, and is heavily timbered for the entire distance. It forms part of a new line 4½ miles long which the company has been obliged to construct owing to the caving of the bank of the Mississippi River, which threatens the entire destruction of the present road-bed within a short time.

The trustees who held $100,000 in bonds issued by the city of Vicksburg, Miss., to this road have turned them over to the company, they being satisfied that, as the company had purchased and paid for the ground for its repair shops and commenced work on the shops, it was complying in good faith with the agreement under which the bonds were issued.

This company makes the following statement for February and the two months to Feb. 28:

	February.		Two months.	
	1886	1885	1886.	1885.
Earnings	$139,210	$98,616	$298 957	$197,913
Expenses	104,568	75,044	228,030	165,036
Net earnings	$34,642	$23,572	$70,918	$32,877

For the two months the gross earnings increased $101,044, or 51.0 per cent., and the expenses $63,003, or 38.2 per cent., leaving a gain of $38,041, or 115.7 per cent., in net earnings.

Louisville Southern.—There is an attempt to revive this project for a new line from Louisville, Ky., southward, and a number of Louisville merchants have offered to take stock, provided the control of the project is transferred to them.

Memphis & Charleston.—The gross and net earnings for February and for eight months from July 1 to Feb. 28 have been:

	February.		Eight months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$106,231	$101,147	$949,922	$1,016 094
Expenses	86,046	84.452	647,827	792,022
Net earn.	$20,185	$16,695	$302,095	$224,072

For the eight months the gross earnings decreased $66,172, or 6.5 per cent., and the expenses $144,195, or 18.2 per cent., the result being a gain of $78,023, or 34.8 per cent., in net earnings.

Mexican Railroad Notes.—The following notes are from the Mexican *Financier*, of April 3:

The Vera Cruz Railway is getting a fair share of business from tourists this year. It offers many attractions in landscape and engineering triumphs, and has an excellent record for safety.

Tourist travel to this country has never before reached the dimensions which it has now assumed. The second of the Raymond excursions, consisting of some 53 persons, reached here this week, and large numbers of other tourists have arrived over the regular trains of the Central or in private cars, a luxurious mode of travel in which the rich classes of the United States are indulging more and more every year. We learn that a number of tourists now in California will visit this country before their return to their homes in the eastern and central states of the American Union. The Central Railway is abundantly able to handle a vastly increased tourist travel, which it will certainly get in the course of the next three or four years.

The *Diario Oficial* prints a decree of the President of the Republic in which he requests judges of circuit and district courts to deal summarily with all persons convicted of attempts to rob or assault railway trains. According to the decree of Dec. 17, 1881, the railroads of the country are made subject to national jurisdiction, and, accordingly, all offenses against railroad trains or against the security and integrity of the railroads themselves are subject to the provisions of the penal code of the Federal District. The Minister of Justice, Señor Baranda, in publishing the decree of the President says that the Federal courts everywhere will be sustained by the Federal troops in the prosecution of criminals committing acts against railways, their trains or passengers. The vigorous action of the Executive Department of the Government in every case of attempts on railway trains is very gratifying. Fortunately, railroad traveling in this country has been almost wholly exempt from attempts of a serious nature.

Missouri Pacific.—The strike on this road is, apparently, at an end. There has been some local trouble, but traffic has been fully resumed, and the officers of the company claim that they have all the men they need. There has been no settlement or adjustment between the company and the strikers, and a large number of those who left work still remain out, and probably will not return. The company, however, is moving freight at all points, and claims to be fully satisfied with the situation.

The locomotive firemen employed on the road have had some grievances, which they have formally presented through the officers of their Brotherhood. In this case the complaints were received and considered, and an amicable settlement has been reached without trouble.

Monocacy Valley.—This company has been organized to build a railroad about 4 miles long from Mechanicstown, Md., on the Western Maryland road, to Catoctin Furnace.

New Brunswick.—The Boston *Advertiser* of April 14, says: "It is reported that the New Brunswick Railroad Co. is negotiating for the purchase of that portion of the Maine Central (European & North American) road between Vanceboro and Mattawamkeag, with a primary view to obtaining direct connection with the Megantic line, and also to prevent the future possibility of a branch road from Bangor to Houlton. This report has not been officially confirmed. The section desired is 55 miles long." It does not appear probable that the Maine Central Co. would be willing to part with this section of road, which is of value to it for the same reasons which would lead the New Brunswick Co. to want it.

New Orleans & Northeastern.—The gauge of this road, extending from New Orleans to Meridian, Miss., 195 miles, was changed from 5 ft. to standard gauge on Sunday, April 11, anticipating somewhat the general change of the Southern roads, which is to be made on May 31 and June 1. The gauge adopted for this road, by the way, and for all the lines controlled by the Cincinnati, New Orleans & Texas Pacific Co., is 4 ft. 8½ in., instead of 4 ft. 9 in., which was adopted as the general Southern gauge, the managers of the road having decided that 4 ft. 8½ in. is preferable.

New York & New England.—The committee of the Massachusetts Legislature appointed to examine the claim of Cyrus W. Field and others, for damages in relation to the sale of the second-mortgage bonds owned by the state, still

continues to take testimony. This week they have been hearing witnesses for the Field side, including Mr. Field himself and Russell Sage, who both testified that the intention of foreclosing the second mortgage was attributed to them entirely without reason, and that their intentions were to benefit the road.

New York, Rutland & Montreal.—The Central National Bank of Boston, acting for itself and as trustee for other holders, has brought suit against this company, William Foster, Jr., and others, as purchasers of the Lebanon Springs Railroad. The suit is brought to recover the amount of $350,000 receiver's certificates issued while the road was in possession of J. W. Van Valkenburg as Receiver. The property was sold under foreclosure some months ago and purchased by Mr. Foster and associates, who have recently organized a company under the name given above.

North Pacific Coast.—This road is now completed and opened for business to Ingram, Cal., 8 miles northward from the late terminus at Duncan Mills and 81 miles from the southern terminus at Saucelito on San Francisco Bay. The extension runs through a dense redwood forest.

Ohio & Mississippi.—The statement for February and the two months to Feb. 28 is as follows:

	February.		Two months.	
	1886.	1885.	1886.	1885.
Earnings	$274,429	$267,879	$548,609	$568,179
Expenses	218,798	246,151	432,128	472,542
Net earnings	$55,631	$21,728	$116,481	$95,637

For the two months the gross earnings decreased $19,570 or 3.4 per cent., and the expenses $40,414, or 8.5 per cent., the result being a gain of $20,844, or 21.8 per cent. in net earnings.

Ohio River.—Contracts have been awarded for the grading of the extension of this road from the present terminus at Parkersburg, W. Va., upon the West Virginia side of the Ohio River, to Point Pleasant, where the road will connect with the Kanawha & Ohio. The distance is about 80 miles. The contractors are to begin work immediately and the intention is to have the road completed this year. Contracts have already been let for the making of rails, which will be delivered in time to have the tracklayers follow up the grading pretty closely as it is completed.

Omaha Southern.—This company has filed articles of incorporation to build a railroad from Omaha, Neb., southwest to the Kansas line in Jefferson County. The office of the company is in Beatrice, where all the incorporators reside.

Painesville, Wooster & Ohio.—This company has been incorporated to build a railroad from Painesville, O., to Fredericktown, with a branch from Wooster to Zanesville. The road is intended to connect with the projected Zanesville, Mt. Vernon & Marion line, and is incorporated by the same parties.

Philadelphia & Reading.—Mr. Joseph Wharton, as a holder of $500,000 of the convertible adjustment scrip of the Reading Railroad Co., has filed a bill in equity in Philadelphia against that corporation and Samuel W. Bell, substituted trustee of the income mortgage. Certain of the bonds secured by that mortgage were deposited with Mr. Lewis as security for a corresponding amount of the convertible adjustment scrip. Default has been made in payment of the interest due on the scrip since July 1, 1884. The agreement under which the bonds are held by Mr. Bell empowers him to sell them and apply the proceeds to the payment of the interest and principal of the scrip in case of default and subsequent demand by the holders of more than one-tenth in amount thereof. In the present proceedings Mr. Wharton avers that the income bonds securing the scrip are very fluctuating in value and liable to serious depreciation, and asks the Court to make a decree requiring the trustee to sell the bonds which he holds for the benefit of the scripholders.

The Philadelphia *Ledger* says that the Reading Railroad Receivers, having paid off the entire amount of Reading consolidated mortgage interest advanced by Drexel & Co. in June last, this week made a considerable payment on account of the advance of that interest in December last.

The committee of general mortgage bondholders consisting of E. Dunbar Lockwood, Chairman, and John A. Wright, T. Morris Perot, A. Dutenhoffer, Francis A. Lewis and E. W. Bailey, have issued an address to the general mortgage bondholders, giving the result of its investigations.

The report first takes up the plan of the syndicate, and summarizes the objection to the plan as follows:

"First—That the plan is unjust to the general mortgage bondholders.

"Second—That the income and first 5s are inequitably treated.

"Third—That the machinery by which the plan is to be put into operation is unnecessarily cumbersome, and partakes largely of the characteristics of an uncertain and indefinite agreement.

"Fourth—That authority is conferred upon the board which should be reserved for the direction of the new company.

"Fifth—That the reorganization will be unduly expensive.

"Sixth—That it transfers to the syndicate a means of profit in the options which should be reserved for the benefit of the new company.

"Seventh—That the reserved powers to change any part of the plan, and the uncertainties connected with the settlements under it involve risks which should not be accepted by any creditor of any company."

The committee disposes of Mr. Gowen's plan in this little paragraph:

"It is not necessary to further discuss Mr. Gowen's plan. There are in it so many points of weakness that its failure seems inevitable."

The address concludes with the following outline of a plan which in the mind of the committee embraces the equities of the case:

"First—A sale under foreclosure is inevitable—all other suggestions are illusory.

"Second—The general scheme, as in both plans, of a new mortgage (general or new consolidated) of $100,000,000 and its application as recommended in the plan of the syndicate.

"Third. The exchange of present general mortgage bonds for a new 4 per cent. bond and a first preferred stock, as provided in the plan of the syndicate, but limited to the general mortgage holders.

"Fourth. Adopt the assessments of syndicate plans, and the grouping of interests, and give to the income and first 5s a second preferred stock to represent their assessments and their principal and interest due, and so on to the next group, a third preferred stock, and to the shareholders additional stock to represent their assessment.

"If the syndicate will modify its plan to suit these suggestions, and sunder all relations with any board of trustees or committee now existing, and simplify the agreements in accordance with the principles heretofore suggested, there should be no difficulty in carrying through such modified plan."

Portland & Willamette Valley.—Contracts for grading this road from Portland, Ore., southward to Dundee, the northern terminus of the Oregonian road, a distance of 28 miles, have all been let. The contract for the bridging and trestle-work on the 14 miles from Dundee to the Tualatin River have been let, and the bridging of the remaining 14 miles was to have been let this week.

Richmond, Fredericksburg & Potomac.—The Virginia Court of Appeals has finally decided the case of the Gordon estate against this company, which has been in the courts for several years. In 1881, the company made a dividend on the common stock, payable in securities known as dividend obligations, to receive the same dividend as might be paid on the stock. The holders of the guaranteed or preferred stock claimed that under the conditions under which that stock was issued they were entitled to receive these dividend obligations in the same proportion as the common stock, but the company decided to contest this claim. The suit was decided in the lower court in favor of the company, but the Court of Appeals reversed this decision, holding that the guaranteed stockholders are entitled to share equally with the common stockholders in any excess over the ordinary dividend, and remanded the case. Upon this the lower court made a decision in accordance with the decree of the Court of Appeals, but confined the benefits of the decision to the holders of the guaranteed stock who joined in the original suit, excluding all those who had not appeared. The case was then carried to the Court of Appeals for the second time, and that Court has now decided that all the guaranteed stockholders are entitled to share in the division. The amount of the guaranteed stock is about $500,000, and under this decision the company will be required to issue dividend obligations to 70 per cent. of this amount.

Rome, Watertown & Ogdensburg.—Arrangements have been made for depositing the income bonds with the Central Trust Co., and the issue in exchange therefor of first consolidated convertible 5s maturing July 1, 1922, to the amount of 40 per cent. of the face value of the income bonds and capital stock for the other 60 per cent. This arrangement will reduce the bonded debt $670,934, and the interest from $569,635 to $485,768. The consolidated mortgage bonds issued in exchange for income bonds deposited prior to April 14, 1886, will carry coupons of 2½ per cent., due April 1, 1886. Copies of the agreement may be signed at the office of the company, No. 10 Pine street, New York, or at the Central Trust Co.'s office, No. 15 Nassau street, and all holders are requested to sign said agreement and deposit said bonds at once. It is stated that most of the large holders of the income bonds have already approved of this plan for retiring them.

It is announced that this company has leased the Utica & Black River road, as noted elsewhere. The Black River road is its chief competing line, meeting this road at several important points.

St. Paul, Minneapolis & Manitoba.—This company's engineers are now completing the location of an extension of the Devil's Lake Branch, from Devil's Lake, Dak., to Turtle Mountain, and work will begin on the extension as soon as the engineers are through.

Work has been resumed on the branch from St. Cloud, Minn., to Willmar, 20 miles of which, from St. Cloud southward were graded last year. The work on the grading is being extended and the rails are being put down on the graded line.

Savannah, Dublin & Western.—This company has executed a mortgage on its projected line to secure an issue of $3,000,000 in 6 per cent. bonds having thirty years to run. It is stated that arrangements have been made to place these bonds in London. The projected line is to extend from Savannah, through Dublin to Macon, Ga., 157 miles, and it is proposed also to build a branch from Dublin southwest to Americus, 90 miles. The company has acquired possession of the Macon & Dublin road, which is graded for some 30 miles from Macon, and has let a contract for the grading of the remaining 22 miles to Dublin to J. H. Howard & Co., of Macon. The contract for the 40 miles of grading from Savannah westward has also been let to Bawman & Myrick, of Holton, Ga., these contractors to begin work immediately. The company expects that its road will secure a considerable share of the through traffic to Savannah and that it will also develop the extensive timber belt and will secure considerable local business.

Savannah, Griffin & North Alabama.—It is reported that work will soon be begun on an extension of this road from its present terminus at Griffin, Ga., to Chattanooga. A considerable amount has already been expended in putting the road in good condition.

Southern Pacific Co.—This company's statement for January is as follows:

	Atlantic System.	Pacific System.	Total.
Earnings	$734,978	$1,273,442	$2,008,420
Expenses	516,475	784,778	1,301,253
Net earnings	$218,503	$488,664	$707,167
Add rental Mojave Division			46,681
Total			$753,848
Fixed charges		$1,186,107	
Construction and improvement		11,802	
			1,197,909
Deficit for the month			$444,061

The decrease in total gross earnings this year was $337,045, or 14 4 per cent.; in net earnings, $406,612; or 36.5 per cent. The mileage worked was 4,667, against 4,585 last year. Fixed charges include interest, rentals, taxes and government requirements.

Springfield & New London.—The stockholders of this company met in Springfield, Mass., April 7, and voted to ratify the agreement recently made by the directors for a new lease of the road to the New York & New England Co. for 94 years, at a rental of $3,009 per year. This closed the formal action required of the company. The agreement made with the New York & New England Co. provides for the purchase by that company of the stock of the leased road at $52 per share. The Mayor of Springfield, Mr. Metcalf, acts as agent in making the transfer and receives all the individual holdings sent to him. The majority of the stock is held by the city of Springfield.

Texas & Pacific.—The following is the permanent committee appointed on reorganization of the Texas & Pacific Railway Co.: I. J. Wistar, John Markoe, J. N. Hutchinson, Wm. B. Winsor, J. Lowber Welsh, of Philadelphia; B. F. Newcomer, of Baltimore; Lewis May and T. E. Satterlee, of New York. At their first meeting, on Thursday, General Wistar was elected Chairman and Mr. Satterlee, Secretary. Various propositions for the improvement of the company's affairs were discussed, but it is understood no definite action was taken. The committee will meet again shortly.

Toledo, Cincinnati & St. Louis.—Argument was heard in the United States Circuit Court at Indianapolis this week on the disposition of the proceeds of the foreclosure sale. The Court entered a decree in relation to the payment of rentals on equipment, which had been informally passed upon some weeks ago, but this was objected to by counsel for the bondholders, and an appeal will probably be taken to the United States Supreme Court.

Topeka, Salina & Western.—This road is now in operation to Chico, Kan., 31 miles westward from the late terminus at Hewington, and 58 miles from the starting point at Council Grove. The road is now controlled and will hereafter be operated by the Missouri Pacific.

Union Pacific.—The statement for February and the two months to Feb. 28 is as follows:

	February		Two months	
	1886.	1885.	1886.	1885.
Miles worked	4,519	4,499	4,519	4,499
Earnings	$1,635,141	$1,561,949	$3,063,170	$3,238,898
Expenses	1,187,865	1,183,067	2,458,617	2,371,624
Net earnings	$447,276	$380,882	$604,553	$867,274

For the two months the gross earnings decreased $175,728, or 5.4 per cent., and the expenses increased $86,993, or 3.7 per cent., the result being a decrease in net earnings of $262,721, or 4.0 per cent. Taxes are included in expenses.

The total amount of sales in March were 117,120 acres, for $206,240. For the quarter ending March 31, the land sales on the Union Division were 99,655 acres, for $107,484, and on the Kansas Division 39,036 acres, for $204,330; the total sales being 138,718 acres, for $311,814, a decrease of 45 per cent. in the acreage and of 56 per cent. in the amount of sales.

Utica & Black River.—It is announced that this road is to be leased to the Rome, Watertown & Ogdensburg Co. at a rental equivalent to the fixed charges and 7 per cent. on the stock. The line competes with the Rome road for business at several points and serves the same district in Northern New York, although it has a considerable local territory of its own. It has for some years past paid 6 per cent. dividends, and earned a surplus over. The annual report, which will be found on another page, gives full particulars of the operations for 1885 and 1884.

Virginia Midland.—The New York *Evening Post* of April 14 says: "The report on the street that the Virginia Midland income bonds were to be exchanged for Richmond & Danville general mortgage 5s is incorrect. We have authority for the statement that the Virginia Midland incomes, of which there are $3,987,000 outstanding, are to be exchanged into a new issue of Virginia Midland general mortgage 5s, which are to be limited to the amount of the incomes to be funded together with the accumulated interest to the amount of $340,000, or about 8 per cent. The relations of the Virginia Midland to the Richmond & Danville have not been finally determined yet, but will probably take the form of a lease of the former to the latter at a rental which will guarantee all the fixed charges of the Virginia Midland."

Wabash, St. Louis & Pacific.—The United States Circuit Court has confirmed the report of the Master, recommending that the Receivers of this road be directed to turn over the St. Joseph & St. Louis Branch, extending from North Lexington, Mo., to St. Joseph, to the trustee under the mortgage of that branch. The transfer will be made April 24.

The Court has also confirmed the report of the Master, recommending that the Clarinda Branch be transferred by the Receivers to the trustee under the mortgage on that line, and the necessary order for the transfer was issued.

The bondholders' committee gives notice that general mortgage bonds, to participate in the benefit of the reorganization agreement, must be deposited with the purchasing committee by April 24 next, as no further bonds will be received after that date.

West Jersey.—Work is to be begun at once on the extension of the second track on this road from the present terminus near Glassboro, N. J., to Newfield, the junction of the Atlantic City line, a distance of about 6 miles. This second track is to be completed before the summer travel begins.

West Virginia Central & Pittsburgh.—This company is making arrangements to extend its road from the present terminus at Piedmont, W. Va., to Cumberland, Md., in order to secure additional outlet for its coal traffic over the Chesapeake & Ohio canal and the Pennsylvania Railroad.

Wisconsin Central.—It is reported that this company is making arrangements to build a branch of its road to the Gogebic iron range, in order to secure part of the heavy tonnage from the mines of that range.

The work of finishing up and ballasting the new Chicago Extension is in progress, and the company hopes to have trains running in June, provided there is no unexpected delay in relation to the city terminus. The stations on the extension, with the distances from the starting point at Schleisingerville, Wis., are: Colgate, 6; Sussex, 16; DuPlainville, 20; Waukesha, 25; Mukwonago, 37; Fannew, 45; Burlington, 50; Silver Lake, 61; Antioch, 67; Lake City, 72; Gray's Lake, 77; Holcomb, 83; Half Day, 88; Wheeling, 93; Desplaines, 99; River Park, 106½; River Forest, 111½; Belt Line, 115½; City Limits, 116¼; Chicago, 122 miles.

ANNUAL REPORTS.

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Canadian Government Railroads.

The report of the Canadian Minister of Railways and Canals, for the year ending June 30, 1885, gives the following statements as to the operation of the government roads.

The lines owned by the Dominion of Canada (not including those which are only subsidized) are as follows, with their cost to June 30:

1. The Intercolonial, Halifax to Pt. Levis (Quebec), with branch to St. John, and other branches, 861 miles in all. This road has cost $43,627,594, or $50,671 per mile.

2. Eastern Extension, New Glasgow to Mulgrave (Straits of Canso), 80 miles. This road has cost $1,284,311, or $16,054 per mile.

3. Prince Edward Island, Charlottetown to Tignish, with branches to Souris and Georgetown, 212 miles in all, of 3 ft. 6 in. gauge. This line has cost $3,731,312, or $17,601 per mile.

4. Windsor Branch, Windsor Junction to Windsor, 32 miles. This road is worked by the Windsor & Annapolis Co., the government paying the maintenance of way expenses and receiving one-third of the earnings as rental.

The earnings of the three lines worked by the government were as follows:

	Intercolonial.	Eastern Ext.	P. E. Island
Earnings	$2,368,154	$73,050	$158,588
Expenses	2,441,477	78,273	211,207
Deficit	$73 324	$5,223	$52,619
Earnings per mile	2,750	9.3	748
Per cent. of exps	103.1	107.2	133.2

The Windsor Branch earned $73,353 ($2,292 per mile) and the government's proportion of the receipts was $24,451. The expenses of maintenance paid were $18,752, leaving a profit of $5,699 to the government.

The loss on the three lines worked was $131,166 in all. Deducting the profit on the Windsor Branch, there remains $125,467 as the total loss on the government lines for the year.

Utica & Black River.

This company owns a line from Utica, N. Y., to Morristown, 124 miles, and also owns an extension of 10 miles from Morristown to Ogdensburg, although that section is nominally under a separate organization. It leases the Clayton & Theresa, a branch to Clayton on the St. Lawrence, 16 miles, and the Carthage, Watertown & Sackett's Harbor, a branch to Sackett's Harbor on Lake Ontario, making a total of 180 miles worked. The report is for the year ending Sept. 30.

The equipment consists of 25 locomotives; 22 passenger and 14 baggage, mail and express cars; 399 freight and service cars.

The general account, condensed, is as follows:

Capital stock		$2,047,000
Funded debt		1,750,000
Accounts and balances		89,260
Income account, balance		200,567
Total		$4,086,827
Road and equipment	$3,876,281	
Leased lines	187,014	
Land on Sackett's Harbor Branch	14,021	
Cash and cash items	9,511	
		4,086,827

The funded debt includes $1,107,000 Utica & Black River firsts, due 1891; $500,000 Black River & Morristown firsts, due 1894; $143,000 Ogdensburg & Morristown firsts, due 1891. The last-named bonds bear 5 per cent. interest, the others 7 per cent.

The earnings for the year were as follows:

	1884-5.	1883-84.	Inc. or Dec.	P. c.
Freight	$462,818	$506,036	D. $43,218	8.5
Passengers	289,300	281,130	I. 8,170	2 9
Mail, etc	43,963	43,719	I. 244	0.6
Total	$796,081	$830,885	D. $34,804	4.2
Expenses	479,441	598,513	D. 119,072	19.8
Net earnings	$316 640	$232.372	I. $84,268	36.2
Gross earn per mile	4 423	4 616	D. 193	4.2
Net " " "	1,750	1,291	I. 468	36.2
Per cent. of exps	60.2	72 0	D. 11.8	....

The decrease in freight earnings was due chiefly to the withdrawal from the road (in September, 1884) of the through freight lines between the West and Montreal. Taxes are included in expenses.

The income account was as follows:

Net earnings, as above		$316,640
Interest, etc		3 602
Total		$320,242
Rentals	$39 6.0	
Interest	135,598	
Dividends, 6 per cent	122.820	
		288.028
Balance, surplus for the year		$32,214
Sales of old rails		33,934
Surplus, Oct. 1, 1884		134,419
Total surplus, Sept 30, 1885		$200,567

The President's report says: "No changes in the equipment have been made since our last report, but as we are short of motive power and also of freight cars, some outlay on this account will have to be made during the current year. We have added to construction account about $18,000, which has been expended for lands, new freight depot at Watertown and the building of an additional track from Castor Land station east to the Black River.

"The obstacles existing for some time past, consisting of long and tedious litigation in the town of Orleans matters, and which have hitherto prevented the consolidation of the Clayton & Theresa road with ours, have been removed and the suits terminated; and preparations are now being made and will soon be terminated whereby not only the Clayton & Theresa, but also the Ogdensburg & Morristown Railroad, will be consolidated with our road, both the roads named being united in the one organization known as the Utica & Black River Railroad Company."

Georgia Pacific.

This company's lines are divided into three divisions (which are not connected with each other) as follows: The First Division (5 ft. gauge) from Atlanta, Ga., to Coalburg, Ala.; 177 miles, with 9.24 miles of branches, 186.24 miles. The Second Division (4 ft. 8½ in. gauge) from Cane Creek, Ala., to Columbus, Miss., 75.4 miles, with 3.66 miles of branches, 79.06 miles in all. The Third Division (3 ft. gauge), Greenville, Miss., to Johnsonville, 29.5 miles, with branch from Stoneville to Sharkey, 22.5 miles, 52 miles in all. This is a total of 317.3 miles, and increase of 3.9 miles. The report is for the year ending Sept. 30.

During the year the Second Division was changed from 5 ft. to standard gauge, on account of the change of the Mobile & Ohio, its connecting line. Work is in progress on the line from Coalburg to Cane Creek, to connect the First and Second divisions.

The equipment includes 32 locomotives; 16 passenger and 16 combination cars; 177 box, 37 stock, 183 flat, 498 coal and 12 caboose cars; 1 officers' car and 11 shanty cars.

The general account, condensed, is as follows:

Capital stock		$7,000,000
Funded debt		7,094.000
Car trust and other notes		371,850
Accounts and balances		103.220
Income account		82,641
Total		$14,651,711
Road and equipment	$14,537.548	
Securities owned	35,487	
Accounts and balances	34.029	
Cash	44,647	
		14,651,711

The funded debt includes $3,173,000 firsts and $3,921,000 second-mortgage income bonds.

The earnings of all the road worked were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P.c.
Freight	$464,095	$341,864	I. $122.231	35.7
Passengers	107.861	176,439	D. 8,578	4.9
Mail, etc	34,706	29.671	I. 5,035	17.0
Total	$666,662	$547,974	I. $118,688	21.7
Expenses	463.980	355,"35	I. 108.745	30 6
Net earnings	$202,682	$192,739	I. $9.943	5.2
Gross earn. per mile	2,121	1,826	I. 295	16.3
Net " "	645	642	I. 3	0.5
Per cent. of exps	69 6	64 8	I. 4.8	....

The earnings of each division for the year were as follows:

	Earnings.	Expenses.	Net earnings.	P. c. of exps.
First Division	$486.304	$333,869	$146,435	69.9
Second "	104,200	75.999	28,801	72.4
Third "	76,158	48,712	27.446	64.0
Total	$666,662	$463,980	$202,682	69.6

The First Division suffered from low rates. On the Second Division there was a large gain, chiefly in coal. The Third Division lost traffic on account of the opening of the Louisville, New Orleans & Texas road.

The result of the year was as follows:

Net earnings, as above		$202,682
Taxes	$20,117	
Interest, first mortgage bonds	188.190	
Change of gauge, Second Division	4,144	
New Orleans Exhibit	2,072	
		214,523
Balance, deficit for the year		$11,841

Expenditures for new construction were $23,685; payments on car trusts, $140,018; a total of $163,703 for additions to property.

The traffic on the First and Second divisions was as follows:

	First Div.	Second Div.	Total.
Passenger train miles			201.399
Freight " "			530,544
Total locomotive miles			864,610
Freight car-miles	4,275,841		
Passengers carried	98.715	17,472	116,187
Tons freight carried	313,734	82,690	396,424

Locomotive service cost 12.82 cents per mile run.

During the year 4 miles of steel rails and 40,711 new ties were used in renewals. There were 14 miles of track ballasted. Two coal branches were built, one to Henryellen from the First Division, 1.24 miles, and one to Cane Creek from the Second Division, 2.66 miles.

The President, Mr. John W. Johnston, says in his report: "Under a mutually advantageous agreement recently entered into between the Mobile & Ohio Railroad Co. and this company, we will, on the 1st day of December, 1885, take charge of the branch roads of the M. & O., extending from Columbus, Miss., through Artesia to Starkeville, 25 miles, and will hold and operate the same for and on account of that company. Under this arrangement we will have direct connection with the main line of the M. & O. at Artesia and with the Illinois Central road at Starkeville.

"There has been on the broad gauge divisions a very large increase of tonnage without a corresponding increase in revenue. If the revenue per ton-mile had continued in 1885 as high as in 1884, we would have $163,796 more net revenue from this source alone, a sum about equal to all the charges this year to betterment account, both for construction and equipment. On the First Division the falling off in rates was mainly on our large and growing tonnage in coal, lumber and pig-iron, and was consequent upon the depressed condition of general business throughout the country, and the exigencies of competion."

Houston & Texas Central.

The Receivers who have been in possession of this road since Feb. 23, 1885, have published a report for the year ending Dec. 31, from which the statements below are taken. This is the first annual report ever made for this road, the company having confined itself to the publication of a very brief statement of earnings and expenses.

The road owned includes the main line from Houston, Tex., to Red River City, 344.80 miles, with branches from Hempstead to Austin, 118.75, and Bremond to Ross, 57; a total of 520.55 miles. The equipment includes 69 locomotives and 1,844 cars.

No general balance sheet for the company is included, but the Receivers present the following as of Dec. 31, 1884.

Capital stock		$7,726,900
Bonded debt		16.874 500
Other liabilities		5,547,437
Balance, representing excess of assets		1,504 542
Total		$31,653,379
Construction	$24,633,728	
Equipment	2,398,821	
Real estate	1,022.823	
Total cost of road	$28.055,372	
Other assets	3,598,007	
		31,653,379

Since the appointment of the Receivers there have been 135 miles of steel rails and 309,000 new ties put in the track, several new bridges built and much other work done towards improving the condition of the road.

The traffic for the full year ending Dec. 31 was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passenger train miles	725,230	741,815	D. 16.585	2 2
Freight " "	775,130	753,045	I. 22,085	2.9
Passengers carried	517.257	517,704	D. 447	0.1
Passenger-miles	21,234,684	23,358,115	D. 2,123,431	9.0
Tons freight carried	414,277	367,944	I. 46,333	12 6
Ton-miles	68,781 220	60,869,492	I. 8,911,728	14.9
Av. train load:				
Passengers, No	29.3	31 5	D. 2.2	7.0
Freight, tons	88.7	79.5	I. 9.2	11 6
Av. rate:				
Per passenger-mile	2.75 cts.	2.63 cts.	I. 0.12 ct.	4.6
Per ton-mile	2.83 "	2.75 "	I. 0.08 "	2.9

The freight traffic shows a gain over 1884. Previous to that year there had been a steady decline since 1880, the decrease of 1884 from 1880 having been 47.3 per cent., and of 1885 from the same year 39.6 per cent. Rates have not changed greatly, having been higher last year than in 1880, when there was a heavy fall, the average rate of 2.58 cents per ton-mile in that year comparing with 3.39 cents in 1879. Passenger traffic increased up to 1883, but has fallen off since. The passenger rate has fallen largely, from 3.99 cents per passenger-mile in 1879 and 4.00 cents in 1880. The decrease in traffic is largely due to the building of new roads.

The earnings per train-mile last year were: Passenger, 97.58 cents; freight, 251.47; average, all trains, 178.49. The expenses were 138.91 and the net earnings 39.58 cents.

The earnings for the full year ending Dec. 31 were:

	1885	1884.	Inc. or Dec.	P c.
Freight	$1,949,292	$1,673,450	I. $275.842	16.5
Passengers	583,954	617,165	D. 33,211	5.4
Mail and express	124.765	113,706	I. 11,059	9 7
Rents, etc	81,904	143 526	D. 61,622	42.8
Total	$2,739.915	$2,547.847	I. $192.068	7.5
Expenses	2,212,559	2,220.110	D. 7,551	0.3
Net earnings	$527,356	$327.737	I. $199 619	60.9
Gross earn. per mile	5,263	4 894	I. 369	7.5
Net " " "	1,013	629	I. 384	60.9
Per cent. of expenses	80.8	87.1	D. 6.3	....

Expenses include extraordinary repairs and renewals amounting to $160,182 in 1885 and $641,920 in 1884.

Interest on floating debt and payments on state debt last year amounted to $68,117, leaving a balance of $459,239. Interest on the bonded debt (not paid) amounted to $1,193,200, showing a deficit of $733,961 for the year.

The Receivers' statement for the time (10 months 5 days) during which they operated the road is as follows:

Earnings		$2,464.505
Expenses		1,702,341
Net earnings		$762,164
Taxes, state debt, interest on floating debt	$114,155	
New equipment and construction	125,345	
Wages, taxes, etc., accruing prior to receivership	265.722	
		505,222
Unapplied surplus		$256,942

The Receivers present the following balance sheet of their operations up to Dec. 31:

Unapplied surplus as above		$256,942
Mortgage bond land sales	$165,773	
Less paid to trustees	131,629	
		34 144
Due on pay rolls, vouchers and open accounts		435,901
Total liabilities		$726,987
Cash in Houston and New York	$485,763	
Mortgage bond land sale fund	34,144	
Due by agents and others	207,080	
		726.987

In addition, there remain to be paid on payments directed by the Court, for steel rails, $309,000; fencing, $30,000; stock damage claim, $6,000; passenger and freight cars, $44,000; car trust notes, $41,680; a total of $430,680.

The report says: "As will be seen from the above the Receivers owe:

For amounts due on pay rolls, bills, etc	$425 901
For amounts yet due on payments directed by the Court	430.6 0
Total to be paid	$856,582
The Receivers have in cash	$485,763
In accounts due them	207,080
	692.843
Leaving a deficit in immediate requirements of	$173,739

"Toward this is applicable about $90,000 due from old rails sold and about a similar amount from the old rails to be taken up and replaced by the steel rails ordered and now coming forward.

"While it became necessary in the earlier months of the year 1885 to obtain authority from the Court to issue receivers' certificates, it is expected that the business in the earlier months of 1886 will be better than in 1885, and that the payments to be made as above can be deferred until they can be met from the surplus earnings. * * *

"As the cost of operating the road has seemingly been greater under the Receivers, when compared with the sums reported as operating expenses in preceding years, they deem it due, both to themselves as well as those interested in the property, to present such information in relation thereto as has been ascertained from the records of the company since the Receivers have been in possession. * * *

"Including the $125,344 expended for new equipments and additions as directed by the Court under 'extraordinary repairs and renewals,' the expenses for the year 1885 are $7,551 less than they were in 1884, including the $641,920 reported as having been expended for 'extraordinary repairs and renewals' in that year. Referring to the sum charged under this head in the year 1884, it will be seen that it about covers the increase in the operating expenses of the Receivers, and that in the aggregate the cost of operating and maintaining the physical condition of the property under the Receivers, as compared with the cost of similar repairs or renewals in 1884, shows no material difference, except in the fact that the Receivers have charged to operating expenses all that properly comes under that head, whereas it seems to have been the practice in former years to charge to them only a portion of the expenses, and those incurred in extraordinary repairs and renewals to a separate account. * * *

"The Receivers present for the general information of those interested in this property several tables showing the earnings, expenses, mileage, bonded debt and other data, from which the following summary is taken:

Earnings of the road from 1878 to 1884 inclusive, covering a period of seven years	$22,572.577
Charges:	
For operating expenses	12,745,869
And to "construction," for extraordinary repairs, renewals and betterments	2 879,934
Equipment	419,339
Interest on state and floating debt	958,139
Total charges	$17,003.281
Surplus earnings	$5,569,296
Paid for interest on bonded debt	7,964.465
Excess of payment for interest on bonded debt over surplus earnings	$2,395.168

"This deficit was met by an increase in the funded and floating debt as follows:

	Bonded debt.	Float. debt.
Reported outstanding Dec. 31, 1884	$16,874,500	$5.547,437
Reported outstanding, April 30, 1879	14.586,500	3,089,095
Increase	$2,288,000	$2.458,342

"Although there has been no increase in the miles of road owned from 1879 to 1884, there has been charged to construction the sum of $2,763,708, or about $5,309 per mile of road, during that period, in which is included $911,267 for about 428 miles of steel rails raid, and to equipment has been charged the sum of $567,749, representing the addition of 3 locomotives and 512 freight cars during the seven years, the passenger equipment showing a loss of 6 cars during the same period. It is therefore obvious that, except so far as the cost is represented in the rolling stock added to the road and of the steel rails laid, a very considerable part of the expenditures appearing in construction and equipment were for extraordinary repairs and renewals, which the Receivers have properly included in the current expenses of maintaining the property, and to the elimination of these expenses from the current expenses of the road in preceding years is due the present disappointment in the surplus available for interest on capital."